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STRENGTHS OF GAMMA-RAY TRANSITIONS IN A = 6–44 NUCLEI (III)

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The present tables list the strengths (in Weisskopf units) of over 2400 γ-ray transitions in A = 6–44 nuclei, classified according to character (electric or magnetic, multipolarity, isospin forbiddenness). Selected transitions from unbound states are included. The strengths for isovector $E1$ and $M1$ transitions ($E1_{IV}$ and $M1_{IV}$) show a marked decrease with A. Strengths depend very little on the excitation energy of the initial state. The new data incorporated in the tables have not given rise to changes in the recommended upper limits (RUL) for γ-ray strengths presently in use. The only exception is the (spectroscopically unimportant) RUL for $E1_{IV}$ transitions which should be raised from 0.1 to 0.3 W.u. for A = 6–20 nuclei.

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CONTENTS

INTRODUCTION

Scope

The present paper is an update of two previous reviews on γ-ray strengths by Endt and Van der Leun.[1,2] A stimulus for the writing of such an update has been provided by the fact that in 1978 Ajzenberg-Selove had just finished the most recent of her series of review papers on A = 5–20 nuclei,[3–7] while in the same year the sixth issue of "Energy levels of A = 21–44 nuclei" by Endt and Van der Leun also appeared.[8] The bulk of the input data for the present paper have been taken from the above-mentioned reviews.

There is a difference between the present paper and the two previous γ-ray strength reviews as to the selection criteria employed. Formerly, only transitions between bound states for which J^π and T had been determined unambiguously were accepted. The restriction to bound states was imposed to minimize the danger of isospin mixing. All these conditions can be relaxed (and have been relaxed in the present paper), as long as the type of transition (E or M, multipolarity, isospin forbiddenness) is not in doubt.

That the spin of the initial state need not necessarily be known is shown by the example $(\frac{1}{2},\frac{3}{2})^- \rightarrow \frac{3}{2}^+$. If the transition is sufficiently strong (i.e., the $M2$ admixture is negligible), it has $E1$ character for either $J_i^\pi = \frac{1}{2}^-$ or $\frac{3}{2}^-$.

Isospin is of prime importance in self-conjugate nuclei ($T_z = 0$), but for $T_z \neq 0$ its influence is almost negligible. The main component of a $\frac{3}{2}^+ \rightarrow \frac{1}{2}^+$ transition in, say, ^{25}Mg has predominantly $M1_{IV}$ character whatever the isospins ($T = \frac{1}{2}$ or $\frac{3}{2}$) of initial and final states. Generally, for dipole transitions in $T_z \neq 0$ nuclei isospin has no influence on the strength and, consequently, one may also drop the condition that the

initial state be bound. This is not true, however, for a possible $E2$ admixture in the above transition. For $T = 3/2 \rightarrow 1/2$ the admixture would be of (retarded) $E2_{IV}$ character and, just as in self-conjugate nuclei, one would have to be reasonably sure about isospin purity to exclude the possibility of $E2_{IS}$ contamination.

In one respect the present review is more strict than the two previous ones. Formerly, an $EL + M(L + 1)$ transition was accepted as of EL character, even if δ had not been measured. This unnecessary laxity has now been removed. It has now been treated on the same footing as the $ML + E(L + 1)$ transitions with unknown δ, which means that only transitions for which it can be shown (by computing Γ_γ corresponding to the RUL for the admixture) that the admixture contributes less than 50% to the total Γ_γ are accepted. This more formal approach has removed 13 weak $E1$ transitions (with relatively high energy) out of the 192 listed in Ref. 2.

Input Data

As mentioned above, most of the input data (excitation energies, J^π- and T-assignments, lifetimes or γ-ray widths, γ-ray branching and mixing ratios) used in the calculation of the γ-ray strengths listed here, have been taken from Refs. 3 through 8. This does not necessarily mean that all these data are available in easily accessible form in the master tables or auxiliary tables of these reviews. Especially for resonance data (in particular, for resonance branchings and the mixing ratios of primary γ-ray transitions), the reader may have to look up the original literature, which is referred to in the A-chain reviews. References to publications which appeared after the completion of these reviews are listed in the last column of Tables II through XIV.

Approximately one-third of the transitions listed in these tables derive from the γ-decay of unbound states. Most of the latter have been observed as (p,γ) resonances; the (α,γ) and (n,γ) reactions contribute much less. One might ask why these capture reactions have not provided many more transitions; after all, the decay of at least 1000 resonances in the A = 6–44 region has been investigated with Ge(Li) detectors, and on the average the decay of each resonance might proceed by about 10 primary branches. There are several factors contributing to the high rejection percentage. The most important might be that, for example, for the (p,γ) reaction, one has to know the width of all open particle channels in order to calculate the resonance γ-ray width Γ_γ from the resonance strength $(2J + 1)\Gamma_p\Gamma_\gamma/\Gamma$. Even if the only open particle channel is that for ground-state proton decay, an additional experiment, for example, elastic proton scattering, should have been performed to provide Γ_p/Γ. In addition, resonances drop out which are unresolved, or which are situated on the tails of strong nearby broad resonances. Weak high-energy $M1 + E2$ transitions are useless if the mixing ratio is unknown (the $E2$ might exceed the $M1$ component). Finally, strong isoscalar dipole transitions from $T = 0$ resonances in even–even self-conjugate nuclei are suspect, because generally the possibility of sizeable $T = 1$ admixtures cannot be excluded. As an example, only one of the many $^{23}Na(p,\gamma)$ resonances in ^{24}Mg can be used, because mostly their isospin character is too badly known. The (p,γ) reactions on ^{22}Ne, ^{26}Mg, ^{30}Si, and ^{34}S turned out to be particularly prolific.

As mentioned above, resonance γ-ray widths generally derive from resonance strengths. For many years, (p,γ) strengths in the sd-shell have been calibrated on the values given in Ref. 9. Absolute strength measurements in later years, however, have made it increasingly clear that the values in Ref. 9 have to be revised by factors of up to about 2, in either direction. A new set of calibration strengths based on the later measurements (and used in the present paper) is given in Table I. The strengths of the (p,γ) resonances used in Tables III through XIV are connected by relative measurements to the strength of at least one calibration resonance in Table I. The accuracy of (p,γ) resonance strengths based on the present "1979" set of calibration values might be estimated as 25%. In any case, resonance strengths are now good enough to serve as a basis for the calculation of γ-ray strengths which (to be listed) are required to have an error below 50%. Many resonance branchings and strengths appear in the literature without stated errors. In these cases errors of 33% were assigned to the γ-ray strengths derived from them.

It has already been mentioned that (n,γ) resonances contribute very little to the present collection of γ-ray strengths. There is one exception, that is, the negative-energy resonance ($E_n = -180 \pm 30$ eV, $E_x = 8.58$ MeV, $J^\pi = 2^+$) which contributes so much to the large cross section ($\sigma = 43 \pm 2b$) of the $^{35}Cl(n,\gamma)^{36}Cl$ reaction at thermal energy, of which the capture γ-ray spectrum is known in great detail. There is no other case in the $A < 45$ region where thermal capture is dominated to such an extent by a single resonance.

In Ref. 1 it has been explained how mirror transitions in isospin doublets ($T = 1/2$) or triplets ($T = 1$) can be split up into their isoscalar and isovector components. To obtain the strengths of the "weak" components ($E1_{IS}, E2_{IV}, M1_{IS}, M3_{IS}$) with at least 50% accuracy, the strengths of the transition pairs used should be sufficiently different and reasonably accurate; 18 such pairs are listed. The hazards con-

nected with this weak-component extraction procedure are discussed below in the section dealing with the strongest $E1_{IS}$ transitions. There are four cases, in A = 26, 30, 34, and 42, all of $2_1^+ \rightarrow 0_1^+$ character, in which the strengths are known for all three $E2$ transitions between isospin triplet states (with $T_z = -1$, 0, and +1, respectively). The strength of the $E2_{IV}$ component can then be found with a simple least-squares calculation (the best straight line through three equidistant points). It turns out, however, that in all four cases the error in the extracted $E2_{IV}$ strength exceeds 50% (because input errors are too large and the pertinent strength differences too small).

The strengths of some transitions of low energy and/or high multipolarity had to be corrected for electron conversion. Tables of conversion coefficients for $Z \leq 30$ are given in Ref. 27. The values used are indicated in the "References and Remarks" columns of Tables III through XIV.

The γ-ray strengths listed in Tables III through XIV are expressed in Weisskopf units,[28] based on a nuclear-radius constant r_0 = 1.20 fm. The Weisskopf estimates Γ_W (in electron volts) are given below as a function of E_γ (in mega-electron volts) and A:

$$\Gamma_W(E1) = 6.8 \times 10^{-2} A^{2/3} E_\gamma^3$$
$$\Gamma_W(E2) = 4.9 \times 10^{-8} A^{4/3} E_\gamma^5$$
$$\Gamma_W(E3) = 2.3 \times 10^{-14} A^2 E_\gamma^7$$
$$\Gamma_W(E4) = 6.8 \times 10^{-21} A^{8/3} E_\gamma^9$$
$$\Gamma_W(E5) = 1.6 \times 10^{-27} A^{10/3} E_\gamma^{11}$$

$$\Gamma_W(M1) = 2.1 \times 10^{-2} E_\gamma^3$$
$$\Gamma_W(M2) = 1.5 \times 10^{-8} A^{2/3} E_\gamma^5$$
$$\Gamma_W(M3) = 6.8 \times 10^{-15} A^{4/3} E_\gamma^7$$
$$\Gamma_W(M4) = 2.1 \times 10^{-21} A^2 E_\gamma^9$$
$$\Gamma_W(M5) = 4.9 \times 10^{-28} A^{8/3} E_\gamma^{11}$$

The strengths of $E0$ transitions (Table II) are expressed in Wilkinson units (Wi.u.). The definition of this unit and the derivation of the $E0$ strength from either the probability for $e^+ + e^-$ pair formation or from the $B(E0)$ determined from inelastic electron scattering are indicated in Refs. 2 and 29, respectively.

In the Figure the strength distributions obtained are presented in the form of histograms.

Average Strengths

As to the average strengths, it might not be superfluous to repeat the remark made in Ref. 1, that such averages are very much determined by the present status of γ-ray detection techniques. Many weak transitions have not been reported because they are below the detection limit. The real average of all transitions is thus way below the average of detected transitions. The argument sometimes used, that a particular transition is, for instance, weaker by a factor of 1000 than the average $E1_{IV}$ (determined by detected transitions), and thus cannot have $E1_{IV}$ character, consequently is entirely unjustified. Of course, the detection limit also largely determines the widths of the observed strength distributions (see the Figure). It readily explains why the distribution widths (FWHM) for strong transitions ($E1_{IV}$,$M1_{IV}$,$E2_{IS}$) are so much larger than for weak transitions ($E0$, $E1_{IS}$, $M1_{IS}$, $E2_{IV}$, $M2_{IV}$, and so on).

It remains interesting, however, to investigate a possible strength dependence on A or on the excitation energy of the initial state. For this purpose it was decided to use the average of the 10% strongest transitions (in a given group), rather than the average of all transitions listed. It was felt that in this way to some extent the effect of a time-dependent detection limit is eliminated. All averages are to be interpreted as logarithmic averages.

Finally, it goes without saying that the weakest transition in a given group is also dependent on the development of detection techniques. The occasional mention of them in the next section is primarily based on the author's collector's joy. Why a particular transition is exceptionally weak is certainly of theoretical interest. It may well be caused by accidental cancellation of two (or more) medium large components in the matrix element.

Strong Transitions and Recommended Upper Limits

The recommended upper limits (RUL) for transitions of a given character evidently depend on the strongest transitions in this group, which are to be discussed below. In addition, the strength dependence on A and on E_{xi} will be mentioned, at least for the numerically well represented groups.

E0. In Table II, 21 transitions are listed. It is disturbing that there are discrepancies between the results from (e,e') and from $e^+ + e^-$ yield measurements for the 0_2^+ states of ^{18}O and ^{26}Mg; the latter are considered more reliable.

$E1_{IV}$ (T-allowed). This numerous group (706 transitions) is listed in Table III. The 1974 RUL value[2] amounted to 100 mW.u. The strengths of all transitions in the A = 21–44 region are below this limit (the strongest is the 70 ± 20 mW.u. $3/2_2^- \rightarrow 1/2_1^+$ transition in ^{21}Na), but for A = 6–20 there are four transitions (in ^{9}Be, ^{11}Be, ^{13}N, and ^{15}O) which exceed (or equal) the old RUL value; the strongest, the ^{11}Be, 0.32 → 0 MeV, $1/2^- \rightarrow 1/2^+$ transition has 330 ± 110 mW.u.

The phenomenon that $E1$ strengths decrease with A has been known for a long time and has been attributed by Wilkinson[28] to increasing configuration

mixing in the heavier nuclei. The effect is demonstrated in a convincing way by the present set of data; the average $E1_{IV}$ strengths of the 10% strongest transitions for A = 6–20 and 21–44 (130 and 9 mW.u., respectively) differ by a factor of 14. As a check of this explanation one might investigate whether the $E1_{IV}$ strengths decrease with E_{xi} because, presumably, configuration mixing increases with E_{xi}. This is not substantiated by the data, however. The averages of the 10% strongest transitions for E_{xi} below and above 5 MeV turn out to be almost the same. Apparently, high-lying levels mix to a larger extent with the giant $E1$ resonance, which compensates for the effect of stronger configuration mixing.

The strong $E1_{IV}$ A-dependence can best be taken into account by increasing the RUL for the A = 6–20 region from 100 mW.u. to, say, 300 mW.u. It should be noted that for spectroscopic use the RULs for $E1_{IV}$ and $M1_{IV}$ transitions are completely irrelevant. Only the RULs for the slower transitions ($E1_{IS}$, $M1_{IS}$, $E2$, $M2$, and so on) are of help in the elimination of J^{π} or T possibilities.

By far the weakest transition observed so far is the 3.16 → 1.76 MeV, $7/2^- \rightarrow 5/2^+$ transition in ^{35}Cl, with S = 20 ± 3 nW.u.! The weakest transition in the 1974 review, 5.15 → 1.27 MeV, $2^- \rightarrow 2^+$ in ^{22}Ne is no longer remarkable because a new measurement has reduced the lifetime of the upper level by a factor of 700. Some weak transitions with unknown mixing ratio have dropped out because substantial $E1$–$M2$ mixing cannot be excluded. Among these is the interesting 2.79 → 0 MeV, $1/2^- \rightarrow 3/2^+$ transition in ^{21}Ne; for $\delta = 0$ the $E1$ strength would only be 84 ± 7 nW.u., but the actual $E1$ strength may be much smaller because $\delta \gg 1$ is a perfectly reasonable possibility.

$E1_{IS}$ (T-forbidden). This important group (see Table IV) has been very much strengthened since our 1974 review (from 50 to 136 cases).

There are two entries exceeding the 1974 RUL which had been set at 3 mW.u. Both derive from $E1$ mirror pairs, of which the relevant data are listed in Table A.

TABLE A

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$S(E1)$ (mW.u.)	$J_i^{\pi} \rightarrow J_f^{\pi}$	$S(E1_{IS})$ (mW.u.)
^{13}C	3.09 → 0	40 ± 4	$1/2^+ \rightarrow 1/2^-$	3.8 ± 1.9
^{13}N	2.37 → 0	100 ± 20		
^{21}Ne	4.73 → 2.80	3.2 ± 1.3	$3/2^- \rightarrow 1/2^+$	11 ± 4
^{21}Na	4.17 → 2.43	70 ± 20		

All states involved have marked single-particle character ($2s_{1/2} \rightarrow 1p_{1/2}$ for A = 13, and $2p_{3/2} \rightarrow 2s_{1/2}$ for A = 21), as shown by the large spectroscopic factors in single-nucleon transfer reactions, large proton widths of the initial states of ^{13}N and ^{21}Na, and large Coulomb energy shifts of mirror levels. The initial states of ^{13}N and ^{21}Na are unbound by 0.42 and 1.74 MeV, respectively.

It has recently been proven[30] for the A = 13 case that the big difference in $E1$ strengths is not caused by a large $E1_{IS}$ component, but by the admixture (to both the ground and first excited state of ^{13}C and ^{13}N) of a sizeable component corresponding to a nucleon coupled to the first excited state of ^{12}C. It seems plausible that the A = 21 $E1$ strength difference has the same cause (although a check on the short lifetime of the 4.73-MeV ^{21}Ne level, 10 ± 4 fs, might also be worthwhile). There thus seems to be no valid reason to increase the 1974 RUL for $E1_{IS}$ transitions.

There are five transitions with strengths in the 1- to 3-mW.u. region, of which two are of the mirror transition type (in A = 29 and 33), both of $2p_{3/2} \rightarrow 2s_{1/2}$ character. This group also includes the 6.95 → 0 MeV, $1^- \rightarrow 0^+$ transition in ^{40}Ca, of which the large strength has been discussed by Glockner and Lawson.[31]

From the remarks made above one might be inclined to consider all transitions from unbound states as unsuitable for γ-ray strength considerations, but this would seem an unnecessarily rigorous attitude. Admixtures as mentioned above will cause an additional spread in γ-ray strengths, but it should be recognized that the really "anomalous" strengths are only introduced through the strength *difference* of mirror transitions. The "weak" components extracted from mirror pairs, if very strong, should certainly be regarded with sound suspicion.

There is no dependence of the $E1_{IS}$ strength on A within statistical significance.

$E2_{IS}$ (T-allowed). None of the 674 transitions (Table V) exceeds the 1974 RUL of 100 W.u. The strongest transition is still the 6.029 → 5.25 MeV, $3^+ \rightarrow 2^+$ transition ($\delta > 10$) in ^{40}Ca.

There is no dependence on A or on E_{xi}.

$E2_{IV}$ (T-retarded). There are 21 cases (Table VI) of which 9 are extracted from mirror transitions. The strengths in the latter group, however, do not differ significantly from those for transitions in self-conjugate nuclei. None of the strengths exceeds the 1974 RUL of 10 W.u.

The strongest transition, 9.17 → 6.44 MeV, $2^+; 1 \rightarrow 3^+$, in ^{14}N (S = 5 ± 2 W.u.) might be distrusted because it is based on a very small mixing ratio (δ = +0.031 ± 0.006). Also suspect is the next strongest transition with S = 3.0 ± 0.1 W.u., which is ex-

tracted from the $A = 17$ $\frac{1}{2}_1^+ \rightarrow \frac{5}{2}_1^+$ mirror pair. There are three transitions in the 1- to 3-W.u. region. If the ^{14}N transition indeed could be disregarded one might be justified in reducing the RUL from 10 to 3 W.u.

E3. The number of cases has grown from 21 to 53 (Table VII). The strongest transition is the 3.02 → 0 MeV, $\frac{3}{2}^- \rightarrow \frac{3}{2}^+$ transition in ^{39}K (39 ± 6 W.u.). The RUL remains at 100 W.u. There is no statistically significant A-dependence.

E4 and E5. Both groups have doubled in number (Tables VIII and IX). The 1974 RUL values of 100 W.u. can be retained.

$M1_{IV}$ (T-allowed). The number of cases has increased from 270 to 694 (Table X). None of the transitions exceeds the 1974 RUL of 10 W.u. The strongest transition is still that in ^{6}Li, 3.56 → 0 MeV, 0^+; $1 \rightarrow 1^+$ of 8.6 ± 0.2 W.u. There are another 28 transitions with strengths in the 1- to 10-W.u. region. The strengths span about seven orders of magnitude with (by far) the weakest transition in ^{44}Sc, 0.15 → 0.07 MeV, $0^- \rightarrow 1^-$, with $S = 0.90 \pm 0.03$ μW.u.

Just as for $E1_{IV}$, there is a pronounced strength decrease with A. Average strength (of the strongest 10%) decreases from 3.5 W.u. for A = 6–20 to 0.7 W.u. for A = 21–44. Again, just as for $E1_{IV}$, there is no statistically significant dependence on E_{xi}.

$M1_{IS}$ (T-retarded). Table XI contains 47 transitions. Two of these (in ^{16}O and ^{24}Mg) should be excluded because the upper levels (predominantly of $T = 0$ character) are quite close to $T = 1$ states of the same J^π value, with which they presumably mix. Also excluded should be the 3.65 → 3.18 MeV, $2^+ \rightarrow 2^+$ transition in ^{44}Ti ($S = 70 \pm 20$ mW.u.) because the J^π value of the upper level is quite uncertain. Actually, only the assumption of $E1_{IS}$ character can bring the strength of this remarkable transition to an acceptable value (1.8 mW.u.).

The strengths of all remaining 44 transitions are below the 1974 RUL of 30 mW.u., with the strongest in ^{18}F, 3.79 → 2.10 MeV, $3^- \rightarrow 2^-$ ($S = 19 \pm 3$ mW.u.). There are four more transitions in the 10- to 30-mW.u. region.

$M2_{IV}$ (T-allowed). The number of cases has more than tripled, from 13 to 45 (see Table XII).

The strongest transition is in ^{35}Cl, 7.80 → 0 MeV, $\frac{3}{2}^- \rightarrow \frac{3}{2}^+$, $\delta = +0.33 \pm 0.02$, $S = 3.1 \pm 1.0$ W.u. The error is considered big enough to stick to the 1974 RUL of 3 W.u. There are six transitions with strengths in the 1- to 3-W.u. region.

$M2_{IS}$ (T-forbidden). Of the ten transitions listed (Table XIII), two are suspect for different experimental reasons. The strongest of the remaining transitions, 2.21 → 0 MeV, $1^- \rightarrow 3^+$, $S = 100 \pm 20$ mW.u., in ^{22}Na, equals the 1974 RUL of 100 mW.u.

M3 and M5. See Table XIV. There are no comments in addition to those[2] given in 1974.

Conclusions

The main conclusion from the discussion in the preceding section is that the appreciable improvement in strength statistics (2430 transitions against 930 in 1974), caused in part by the inclusion of transitions from unbound states, has not given rise to changes in the RUL's proposed in 1974, except for $E1_{IV}$ transitions for which, only for A = 6–20, the RUL should be increased from 0.1 to 0.3 W.u. The latter change is immaterial, however, because the $E1_{IV}$ RUL finds no use in experimental nuclear spectroscopy.

The preceding section shows that it is risky to use strength differences of mirror transitions for the extraction of "weak" transition components (as $E1_{IS}$, $M1_{IS}$, or $E2_{IV}$). Such differences may well originate from other causes than the presence of sizeable "weak" components.

In the discussion of RUL's some attention has also been given to the dependence of strengths on A and on the excitation energy of the initial state (E_{xi}). It was mentioned that $E1_{IV}$ and $M1_{IV}$ strengths in the A = 6–20 region are on the average stronger by factors of 14 and 5, respectively, than those in the A = 21–44 region. The third well-represented group, that of the $E2_{IS}$ transitions, shows no statistically significant A-dependence. The strengths in these three groups do not seem to depend on E_{xi}.

EXPLANATION OF TABLES

EL_{IS}, EL_{IV}, ML_{IS}, ML_{IV}	Electric (magnetic) transition of multipolarity L, of isoscalar (isovector) character
E_{xi}, E_{xf}	Excitation energy of initial (final) state (in MeV)
J_i^π, J_f^π	Spin and parity of initial (final) state
Γ_γ, Γ_p, Γ	Gamma-ray width, proton width, total width (in eV) [Note that in the tables Γ_γ is used for the total γ-ray width of an unbound state, that is, for the sum of the γ-ray widths of all deexcitation transitions.]
$\Gamma_W(EL)$, $\Gamma_W(ML)$	Weisskopf estimates (in eV) for EL (ML) transitions as given in Eq. (1)
$\Gamma_{Wi}(E0)$	Wilkinson estimate for $E0$ transitions as given in Ref. 29
S	Strength of a transition in Weisskopf units ($S = \Gamma_\gamma/\Gamma_W$) or (for $E0$ transitions) in Wilkinson units ($S = \Gamma_\gamma/\Gamma_{Wi}$)
$R = r_0A^{1/3}$	Nuclear radius (r_0 = 1.20 fm)
μ_N	Nuclear magneton
$B(EL) = 4\pi\left(\frac{L+3}{3}\right)^2$	$e^2R^{2L}\Gamma_\gamma/\Gamma_W(e^2fm^{2L})$
$B(ML) = \frac{\pi}{10}\left(\frac{L+3}{3}\right)^2$	$\mu_N^2R^{2L-2}\Gamma_\gamma/\Gamma_W(\mu_N^2fm^{2L-2})$
τ_m	Mean life
δ	Mixing ratio
$\delta = 0$	The transition has to be unmixed because of the angular momentum addition rule (as, for example, for $J = 1 \rightarrow 0$ or $\frac{1}{2} \rightarrow \frac{1}{2}$ transitions)
$\delta \approx 0$	The (measured) value of δ is so small that the strength of the admixture can be neglected in the calculation of the strength of the main component
$\delta = [0]$	The transition (with δ not measured) can be assumed to be unmixed; even if the strength of the admixture were up to its RUL value, the corresponding decrease in strength of the main component would be below 50%
RUL	Recommended upper limit
References	When no reference number is given, table values have been taken from Refs. 3–8. References for both the Introduction and the Tables follow the Tables

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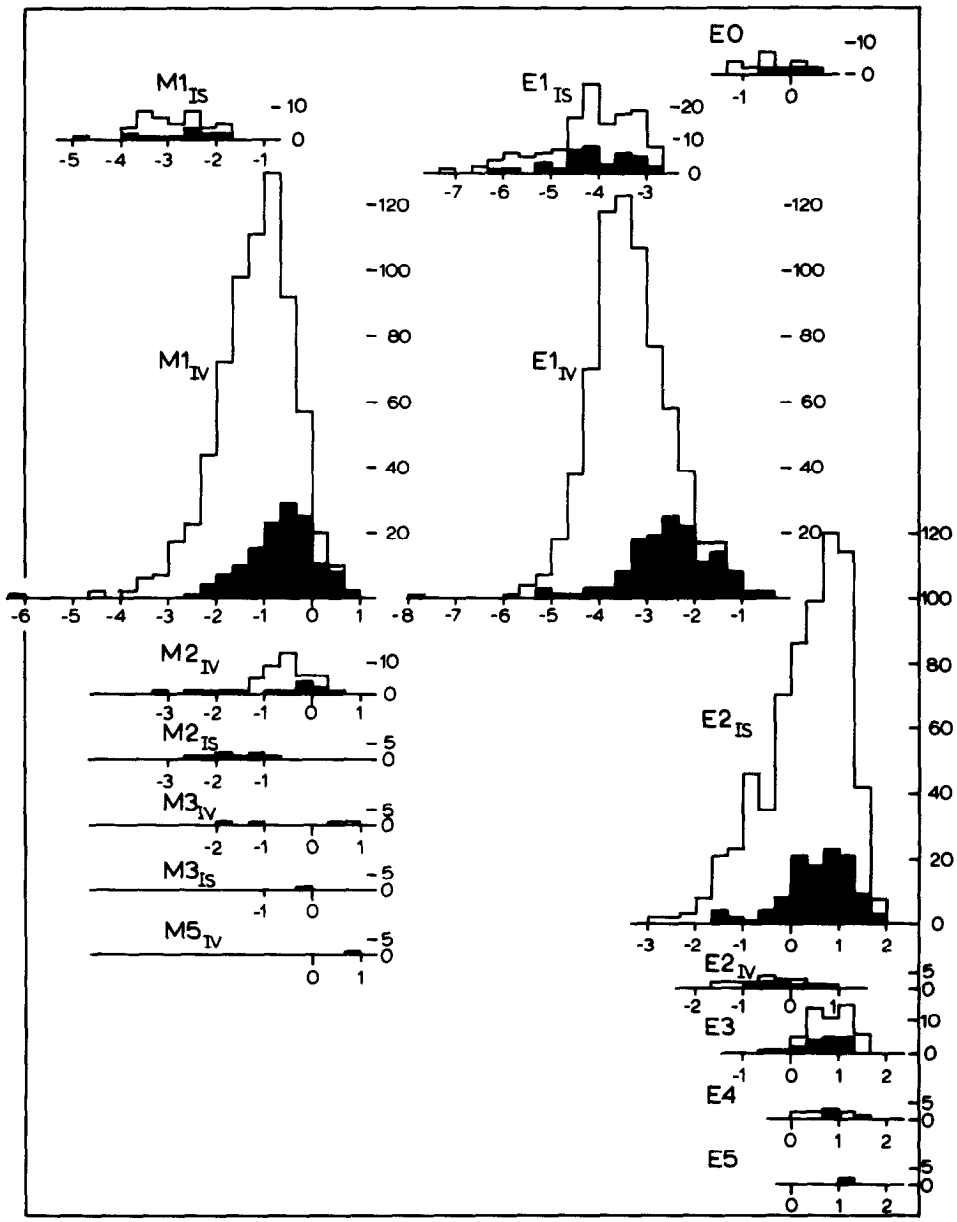

Figure. Strength histograms of γ-ray transitions classified according to character (E or M, multipolarity, isospin forbiddenness; IS = isoscalar, IV = isovector). The logarithmic abscissa scale indicates the strength in Weisskopf units. Also included are $E0$ transitions expressed in Wilkinson units. The full lines relate to the transitions listed in Tables II through XIV (A = 6–44), and the black areas to the subset of transitions in the A = 6–20 region.

TABLE I. Adopted Strengths of (p,γ) Calibration Resonances

See page 9 for Explanation of Tables

Reaction	E_p (keV)	$(2J+1)\Gamma_p\Gamma_\gamma/\Gamma$ (eV) 1966 [b]	1979 [c]	References
$^{23}Na(p,\gamma)^{24}Mg$	512	1.05 ± 0.16	0.74 ± 0.11	19,24
$^{24}Mg(p,\gamma)^{25}Al$	823	0.52 ± 0.08	0.8 ± 0.2	9,11,14,20
$^{25}Mg(p,\gamma)^{26}Al$	433	0.67 ± 0.10	1.0 ± 0.2	
$^{26}Mg(p,\gamma)^{27}Al$	454	0.92 ± 0.14	1.4 ± 0.2	
	1965	5.7 ± 0.8	8.5 ± 0.5	
$^{27}Al(p,\gamma)^{28}Si$	632	5.3 ± 0.8	3.3 ± 0.3	14,16,19,22
	992		24 ± 2	
$^{28}Si(p,\gamma)^{29}P$	371	$(3.4 \pm 0.5) \times 10^{-3}$	$(4.5 \pm 1.1) \times 10^{-3}$	10,12,14,25
$^{29}Si(p,\gamma)^{30}P$	416	0.70 ± 0.10	0.87 ± 0.17	
$^{30}Si(p,\gamma)^{31}P$	620	3.1 ± 0.3	3.8 ± 0.9	
$^{31}P(p,\gamma)^{32}S$	642	0.52 ± 0.08	0.24 ± 0.04	18,24
	811		1.00 ± 0.15	
$^{32}S(p,\gamma)^{33}Cl$	587	0.14 ± 0.02	0.21 ± 0.03	17,21
$^{33}S(p,\gamma)^{34}Cl$	1545		2.3 ± 1.0	17,23
$^{34}S(p,\gamma)^{35}Cl$	1211	21 ± 3	9.7 ± 0.7	16,17
$^{36}S(p,\gamma)^{37}Cl$	1889		24 ± 3	15,17
$^{35}Cl(p,\gamma)^{36}Ar$	860	4.9 ± 0.7	5.5 ± 1.3	9,15,24
$^{37}Cl(p,\gamma)^{38}Ar$	846	1.04 ± 0.15	1.2 ± 0.2	
$^{39}K(p,\gamma)^{40}Ca$	2043	31 ± 5	31 ± 5	9
$^{41}K(p,\gamma)^{42}Ca$	1111	10.0 ± 1.5	10.0 ± 1.5	
$^{40}Ca(p,\gamma)^{41}Sc$	1843	0.26 ± 0.04	0.39 ± 0.10	13

[a] Ref. 26 for $^{28}Si(p,\gamma)^{29}P$ has not been used.
[b] Values from Ref. 9.
[c] Presently adopted values.

TABLE II. Strengths of $E0$ Transitions between 0^+ States

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \to E_{xf}$ (MeV)	τ_m	Branching (%)	Γ_π (eV)	S (Wi.u.)	References and Remarks
^{10}Be	6.18 → 0	1.1 ± 0.4 ps	0.24 ± 0.08	(1.4 ± 0.6)(-6)	(2.2 ± 1.0)(-1)	
^{12}C	7.66 → 0			(6.0 ± 0.4)(-5)	(2.5 ± 0.2)(0)	33, 55
^{16}O	6.05 → 0	96 ± 7 ps	100	(6.8 ± 0.5)(-6)	(6.7 ± 0.5)(-1)	
	12.05 → 0		from B(E0)		(9.6 ± 0.4)(-1)	
^{18}O	3.63 → 0	1.38 ± 0.16 ps	0.30 ± 0.06	(1.4 ± 0.3)(-6)	(1.7 ± 0.4)(0) [a]	
	5.34 → 0		from B(E0)	(2.4 ± 0.7)(-6)	(3.7 ± 1.1)(-1)	
^{20}Ne	6.72 → 0		from B(E0)		(2.4 ± 1.3)(0)	
	7.19 → 0		from B(E0)		(2.1 ± 0.9)(0)	
^{24}Mg	6.43 → 0		from B(E0)		(1.6 ± 0.2)(0)	
^{26}Mg	3.59 → 0	9.5 ± 0.6 ps	0.51 ± 0.07	(3.5 ± 0.5)(-7)	(2.8 ± 0.4)(-1) [b]	
	4.97 → 0		from B(E0)		(3.4 ± 0.4)(-1)	
	6.26 → 0		from B(E0)		$(1.4^{+1.0}_{-0.4})(-1)$	
^{28}Si	4.98 → 0		from B(E0)		(1.3 ± 0.2)(0)	
^{30}Si	3.79 → 0	14 ± 2 ps	0.27 ± 0.03	(1.3 ± 0.2)(-7)	(6.1 ± 1.1)(-2)	
^{32}S	3.78 → 0	1.05 ± 0.20 ps	$(3.5 \pm 0.6) \times 10^{-2}$	(2.2 ± 0.6)(-7)	(9 ± 2)(-2)	
^{34}S	3.91 → 0	1.60 ± 0.25 ps	$(3.8 \pm 0.6) \times 10^{-2}$	(1.6 ± 0.4)(-7)	(5.2 ± 1.1)(-2)	
^{36}S	3.35 → 0	12.7 ± 0.3 ns	100	(5.2 ± 1.2)(-8)	(3.9 ± 0.1)(-2)	
^{38}Ar	3.38 → 0	29 ± 3 ps	0.66 ± 0.10	(1.5 ± 0.3)(-7)	(2.3 ± 0.4)(-1)	
^{40}Ca	3.35 → 0	3.12 ± 0.08 ns	100	(2.10 ± 0.05)(-7)	(1.3 ± 0.1)(-1)	
^{42}Ca	1.84 → 0	480 ± 30 ps	2.05 ± 0.17	(2.8 ± 0.3)(-8)	(3.7 ± 0.4)(-1)	
^{44}Ca	1.88 → 0	20 ± 6 ps	$(8.8 \pm 1.4) \times 10^{-2}$	(2.9 ± 1.0)(-8)	(3.0 ± 1.0)(-1)	

[a] In poor agreement with the value 0.41 ± 0.05 Wi.u. obtained from (e, e').
[b] In poor agreement with the value 0.70 ± 0.15 Wi.u. obtained from (e, e').

TABLE III. Strengths of Isospin-Allowed $E1$ Transitions ($E1_{IV}$)
See page 9 for Explanation of Tables

Nucleus	$E_{xi} \to E_{xf}$ (MeV)	$J_i^\pi;T_i \to J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and remarks
^{9}Be	1.68 → 0	$1/2^+ \to 3/2^-$		from B(E1)		(2.2 ± 0.9)(-1)	see text
	14.39 → 3.05	$3/2^-;3/2 \to 5/2^+$	17 ± 2 eV	7.4 ± 1.8	[0]	(3.6 ± 1.0)(-3)	61
	→ 4.70	$\to 3/2^+$		5.2 ± 1.1	[0]	(3.3 ± 0.8)(-3)	61
	16.98 → 1.68	$1/2^-;3/2 \to 1/2^+$	16 ± 2 eV	8.3 ± 0.4	0	(1.3 ± 0.2)(-3)	
	→ 4.70	$\to 3/2^+$		9.1 ± 0.9	[0]	(2.8 ± 0.4)(-3)	
^{10}Be	6.18 → 5.960	$0^+ \to 1^-$	1.1 ± 0.4 ps	24 ± 2	0	(3.9 ± 1.4)(-2)	
^{11}Be	0.32 → 0	$1/2^- \to 1/2^+$	180 ± 60 fs	100	0	(3.3 ± 1.1)(-1)	see text
^{11}B	7.29 → 0	$(3/2,5/2)^+ \to 3/2^-$	1.2 ± 0.3 eV	87 ± 2	[0]	(7.6 ± 1.9)(-3)	62
	→ 4.45	$\to 5/2^-$		5.5 ± 1.0	[0]	(8 ± 2)(-3)	62
	→ 5.02	$\to 3/2^-$		7.5 ± 1.0	[0]	(2.2 ± 0.6)(-2)	62
	9.19 → 4.45	$7/2^+ \to 5/2^-$	300 meV	85.8 ± 0.4	[0]	(7 ± 2)(-3)	
	→ 6.74	$\to 7/2^-$		13.3 ± 0.4	[0]	(8 ± 3)(-3)	
	9.28 → 0	$5/2^+ \to 3/2^-$	2.3 eV	19.7 ± 1.0	[0]	(1.7 ± 0.6)(-3)	
	→ 4.45	$\to 5/2^-$		67.5 ± 1.0	[0]	(4.1 ± 1.4)(-2)	
	→ 6.75	$\to 7/2^-$		12.8 ± 0.7	[0]	(5.3 ± 1.8)(-2)	
^{12}C	16.11 → 9.64	$2^+;1 \to 3^-$	12 ± 2 eV	2.9 ± 0.4	[0]	(2.2 ± 0.5)(-3)	32
	16.58 → 4.44	$2^-;1 \to 2^+$	8.0 eV	100	[0]	(1.2 ± 0.4)(-2)	
	17.23 → 0	$1^-;1 \to 0^+$	49 eV	90	0	(2.4 ± 0.8)(-2)	
	→ 4.44	$\to 2^+$		10	[0]	(7 ± 2)(-3)	
^{13}C	3.09 → 0	$1/2^+ \to 1/2^-$	1.55 ± 0.15 fs	100	0	(4.0 ± 0.4)(-2)	
	3.68 → 3.09	$3/2^- \to 1/2^+$	1.59 ± 0.13 fs	1.1 ± 0.5	[0]	(6 ± 2)(-3)	
	3.85 → 3.68	$5/2^+ \to 3/2^-$	12.7 ± 0.3 ps	36.0 ± 0.7	[0]	(1.1 ± 0.1)(-2)	47
	15.11 → 3.09	$3/2^-;3/2 \to 1/2^+$	46 ± 4 eV	9.1 ± 1.6	[0]	(6.4 ± 1.1)(-3)	
^{13}N	2.37 → 0	$1/2^+ \to 1/2^-$	510 ± 90 meV	100	0	(1.0 ± 0.2)(-1)	see text
	3.51 → 2.37	$3/2^- \to 1/2^+$	660 meV	8 ± 1	[0]	(9.4 ± 1.3)(-2)	
^{14}N	5.69 → 2.31	$1^- \to 0^+;1$	10 ± 2 fs	69	0	(2.8 ± 0.6)(-3)	43
	8.06 → 0	$1^-;1 \to 1^+$	12.3 eV	79	[0]	(4.7 ± 1.6)(-2)	43
	→ 3.95	$\to 1^+$		12	[0]	(5.5 ± 1.8)(-2)	43
	→ 6.20	$\to 1^+$		0.6	[0]	(2.9 ± 1.0)(-2)	43
	→ 7.03	$\to 2^+$		0.12	[0]	(3.4 ± 1.1)(-2)	43
	8.62 → 5.69	$0^+;1 \to 1^-$	5.2 eV	12	0	(6 ± 2)(-2)	43
	8.91 → 6.44	$3^-;1 \to 3^+$	410 meV	5.2	[0]	(3.5 ± 1.2)(-3)	43
	→ 7.03	$\to 2^+$		2.8	[0]	(4.4 ± 1.5)(-3)	43
	9.17 → 5.69	$2^+;1 \to 1^-$	11.9 eV	0.49 ± 0.10	[0]	(3.4 ± 1.1)(-3)	55
	→ 5.83	$\to 3^-$		0.61 ± 0.08	[0]	(4.8 ± 1.6)(-3)	55
	9.51 → 3.95	$2^-;1 \to 1^+$	4.9 eV	6 ± 1	[0]	(4.3 ± 1.4)(-3)	
	10.43 → 5.11	$2^+;1 \to 2^-$	12.4 ± 1.5 eV	2.4	[0]	(5.0 ± 1.7)(-3)	43
	→ 5.69	$\to 1^-$		1.9	[0]	(5.4 ± 1.8)(-3)	43
^{15}N	5.30 → 0	$1/2^+ \to 1/2^-$	25 ± 7 fs	100	0	(4.3 ± 1.2)(-4)	
	7.30 → 0	$3/2^+ \to 1/2^-$	250 ± 100 as	99.2 ± 0.2	≈ 0	(1.6 ± 0.6)(-2)	
	9.76 → 5.27	$5/2^- \to 5/2^+$	2.7 ± 0.7 fs	8 ± 2	[0]	(5.4 ± 1.9)(-4)	35
	→ 7.16	$\to 5/2^+$		2.3 ± 0.5	[0]	(8 ± 3)(-4)	35
	→ 7.57	$\to 7/2^+$		5.0 ± 0.6	[0]	(2.8 ± 0.8)(-3)	35
	10.70 → 5.27	$3/2^- \to 5/2^+$	370 ± 70 meV	37.4 ± 0.6	≈ 0	(2.1 ± 0.4)(-3)	
	→ 7.30	$\to 3/2^+$		2.3 ± 0.1	≈ 0	(5.3 ± 1.0)(-4)	
	11.44 → 0	$1/2^+ \to 1/2^-$	4.2 ± 0.7 eV	100	0	(6.8 ± 1.1)(-3)	
	11.62 → 0	$1/2^+;3/2 \to 1/2^-$	54 ± 20 eV	91 ± 3	0	(7 ± 3)(-2)	
	12.52 → 6.32	$5/2^+;3/2 \to 3/2^-$	4.6 ± 0.7 eV	5.8 ± 0.6	≈ 0	(2.7 ± 0.4)(-3)	
	13.39 → 0	$3/2^+ \to 1/2^-$	3.0 ± 0.9 eV	100	≈ 0	(3.1 ± 0.9)(-3)	
^{15}O	5.18 → 0	$1/2^+ \to 1/2^-$	8.2 ± 1.5 fs	100	0	(1.4 ± 0.3)(-3)	39
	7.56 → 0	$1/2^+ \to 1/2^-$	42 meV	3.5 ± 0.5	0	(8 ± 3)(-6)	
	→ 6.18	$\to 3/2^-$		57.4 ± 0.6	[0]	(2.3 ± 0.8)(-2)	
	8.28 → 0	$3/2^+ \to 1/2^-$	1.43 eV	53.8 ± 0.3	[0]	(3.2 ± 1.1)(-3)	
	→ 6.18	$\to 3/2^-$		2.2 ± 0.6	[0]	(8 ± 3)(-3)	
	8.74 → 6.18	$1/2^+ \to 3/2^-$	480 meV	33	[0]	(2.7 ± 0.9)(-2)	

TABLE III. Strengths of Isospin-Allowed $E1$ Transitions ($E1_{IV}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \to E_{xf}$ (MeV)	$J_i^\pi;T_i \to J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and remarks
^{15}O	9.49 → 5.24	$5/2^- \to 5/2^+$	2.4 eV	6.5	[0]	(4.9 ± 1.6)(-3)	
	→ 6.86	$\to 5/2^+$		3.4	[0]	(1.1 ± 0.4)(-2)	
	→ 7.28	$\to 7/2^+$		5.1	[0]	(2.7 ± 0.9)(-2)	
	9.61 → 5.24	$3/2^- \to 5/2^+$	5.1 eV	19	[0]	(2.6 ± 0.9)(-3)	
	10.94 → 0	$1/2^+;(3/2) \to 1/2^-$	32 ± 5 eV	44 ± 8	0	(2.6 ± 0.6)(-2)	
	→ 6.18	$\to 3/2^-$		22 ± 8	[0]	(1.6 ± 0.6)(-1)	see text
	11.22 → 0	$3/2^+ \to 1/2^-$	7.4 ± 0.6 eV	74 ± 5	[0]	(9.3 ± 0.9)(-3)	
	11.57 → 5.24	$5/2^- \to 5/2^+$	1.9 ± 0.3 eV	63 ± 9	[0]	(1.1 ± 0.2)(-2)	
	11.75 → 6.18	$5/2^+ \to 3/2^-$	10 ± 2 eV	53 ± 7	[0]	(7.4 ± 1.8)(-2)	
	11.85 → 5.24	$5/2^- \to 5/2^+$	1.4 ± 0.6 eV	100	[0]	(1.2 ± 0.5)(-2)	
^{16}O	13.09 → 0	$1^-;1 \to 0^+$	45 ± 8 eV	96.3 ± 0.8	0	(4.5 ± 0.8)(-2)	
	→ 6.05	$\to 0^+$		0.58 ± 0.12	0	(1.7 ± 0.5)(-3)	
^{17}N	1.85 → 0	$1/2^+ \to 1/2^-$	41^{+20}_{-9} ps	86 ± 3	0	(5.0 ± 1.8)(-6)	
	→ 1.37	$\to 3/2^-$		14 ± 3	≈ 0	(3.0 ± 1.4)(-5)	
	2.53 → 1.37	$5/2^+ \to 3/2^-$	33 ± 3 ps	34 ± 4	≈ 0	(1.0 ± 0.2)(-5)	
	→ 1.91	$\to 5/2^-$		43 ± 4	≈ 0	(7.8 ± 1.0)(-5)	
^{17}F	3.10 → 0.50	$1/2^- \to 1/2^+$	12 ± 2 meV	100	0	(1.5 ± 0.3)(-3)	
	3.86 → 0	$5/2^- \to 5/2^+$	110 ± 20 meV	100	[0]	(4.2 ± 0.8)(-3)	
^{18}O	4.46 → 1.98	$1^- \to 2^+$	65 ± 15 fs	28 ± 2	≈ 0	(3.9 ± 0.9)(-4)	
	→ 3.63	$\to 0^+$		72 ± 2	0	(2.8 ± 0.6)(-2)	
	5.10 → 1.98	$3^- \to 2^+$	62 ± 25 fs	76 ± 2	≈ 0	(6 ± 2)(-4)	
	→ 3.56	$\to 4^+$		8 ± 2	[0]	(5 ± 2)(-4)	
	→ 3.92	$\to 2^+$		16 ± 2	[0]	(2.2 ± 0.9)(-3)	
	5.34 → 4.46	$0^+ \to 1^-$	200 ± 40 fs	40 ± 2	0	(4.1 ± 0.8)(-3)	
	6.20 → 0	$1^- \to 0^+$	3.2 ± 0.6 fs	88 ± 3	0	(1.9 ± 0.4)(-3)	
	7.62 → 0	$1^- \to 0^+$	340 meV	24 ± 2	0	(3.9 ± 1.3)(-4)	
	→ 1.98	$\to 2^+$		62 ± 3	[0]	(2.5 ± 0.8)(-3)	
	→ 5.34	$\to 0^+$		6 ± 1	0	(3.6 ± 1.2)(-3)	
	8.04 → 0	$1^- \to 0^+$	890 meV	16 ± 1	0	(5.8 ± 1.9)(-4)	
	→ 1.98	$\to 2^+$		68 ± 3	[0]	(5.8 ± 1.9)(-3)	
	→ 3.63	$\to 0^+$		11 ± 1	0	(2.4 ± 0.8)(-3)	
	→ 5.26	$\to 2^+$		5 ± 1	[0]	(4.5 ± 1.5)(-3)	
	8.12 → 3.56	$5^- \to 4^+$	220 meV	100	[0]	(5.0 ± 1.7)(-3)	
^{18}F	3.13 → 1.04	$1^- \to 0^+;1$	310 ± 70 fs	34 ± 2	0	(1.7 ± 0.4)(-4)	
	3.79 → 3.06	$3^- \to 2^+;1$	225 ± 35 fs	30 ± 3	≈ 0	(4.9 ± 0.9)(-3)	
	4.86 → 1.04	$1^- \to 0^+;1$	10 ± 2 meV	65 ± 11	0	(2.5 ± 0.7)(-4)	
	→ 3.06	$\to 2^+;1$		23 ± 7	≈ 0	(9 ± 3)(-4)	
	6.10 → 4.65	$4^- \to 4^+;1$	51 ± 10 meV	8.7 ± 0.7	[0]	(2.6 ± 0.5)(-3)	
	6.24 → 0.94	$3^-;1 \to 3^+$	1.5 ± 0.3 eV	4.2 ± 0.4	[0]	(9 ± 2)(-4)	
	→ 3.36	$\to 3^+$		1.0 ± 0.3	[0]	(1.4 ± 0.5)(-3)	
	→ 3.84	$\to 2^+$		1.1 ± 0.2	[0]	(2.5 ± 0.7)(-3)	
	→ 4.12	$\to 3^+$		0.8 ± 0.2	[0]	(3.1 ± 1.0)(-3)	
^{19}F	0.11 → 0	$1/2^- \to 1/2^+$	853 ± 10 ps	100	0	(1.2 ± 0.1)(-3)	
	1.35 → 0.20	$5/2^- \to 5/2^+$	4.8 ± 0.5 ps	3.6 ± 0.7	[0]	(6.6 ± 1.5)(-6)	
	1.46 → 0	$3/2^- \to 1/2^+$	75 ± 13 fs	20.5 ± 0.7	≈ 0	(1.2 ± 0.2)(-3)	
	→ 0.20	$\to 5/2^+$		10.7 ± 0.5	≈ 0	(9.8 ± 1.8)(-4)	
	1.55 → 0.11	$3/2^+ \to 1/2^-$	3.5 ± 1.3 fs	4.9 ± 0.4	[0]	(6 ± 2)(-3)	
	4.56 → 0	$3/2^- \to 1/2^+$	2.9 ± 1.3 fs	36 ± 4	[0]	(1.8 ± 0.8)(-3)	
	4.68 → 0.20	$5/2^- \to 5/2^+$	41 ± 8 meV	6 ± 1	[0]	(5.7 ± 1.5)(-5)	
	5.11 → 0.20	$5/2^- \to 5/2^+$	3.4 ± 1.5 meV	80	[0]	(5 ± 2)(-4)	
	5.50 → 0.11	$3/2^+ \to 1/2^-$	2.1 ± 0.6 eV	25	[0]	(7 ± 2)(-3)	
	→ 1.35	$\to 5/2^-$		16	[0]	(1.0 ± 0.3)(-2)	
	6.28 → 1.35	$5/2^+ \to 5/2^-$	330 ± 70 meV	36 ± 2	≈ 0	(2.0 ± 0.4)(-3)	
	→ 1.46	$\to 3/2^-$		26 ± 2	≈ 0	(1.6 ± 0.3)(-3)	
	6.33 → 1.35	$7/2^+ \to 5/2^-$	190 ± 40 meV	17 ± 2	≈ 0	(5.3 ± 1.2)(-4)	

TABLE III. Strengths of Isospin-Allowed $E1$ Transitions ($E1_{IV}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \to E_{xf}$ (MeV)	$J_i^\pi;T_i \to J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)		S (W.u.)	References and remarks
^{19}F	6.79 → 0	$3/2^- \to 1/2^+$	5.5 ± 0.8 eV	15 ± 2	≈ 0	(5.5 ± 1.1)(-3)	
	→ 0.20	$\to 5/2^+$		13 ± 2	≈ 0	(5.1 ± 1.1)(-3)	
	→ 3.91	$\to 3/2^+$		2.6 ± 1.0	[0]	(1.2 ± 0.5)(-2)	
	6.84 → 1.46	$5/2^+ \to 3/2^-$	330 ± 70 meV	45 ± 8	≈ 0	(2.0 ± 0.5)(-3)	
	6.93 → 0.20	$7/2^- \to 5/2^+$	1.9 ± 0.4 eV	73 ± 3	≈ 0	(9 ± 2)(-3)	
	→ 2.78	$\to 9/2^+$		2.4 ± 0.5	≈ 0	(1.3 ± 0.4)(-3)	
	7.54 → 1.35	$5/2^+;3/2 \to 5/2^-$	5.8 ± 0.7 eV	1.2 ± 0.4	[0]	(6 ± 2)(-4)	
	→ 5.11	$\to 5/2^-$		1.7 ± 0.4	[0]	(1.4 ± 0.4)(-2)	
	7.66 → 5.11	$3/2^+;3/2 \to 5/2^-$	5.3 ± 1.5 eV	5.9 ± 0.5	≈ 0	(3.9 ± 1.2)(-2)	
	8.29 → 4.65	$13/2^- \to 13/2^+$	76 ± 11 meV	9 ± 1	[0]	(2.8 ± 0.4)(-4)	
	8.96 → 2.78	$11/2^- \to 9/2^+$	230 ± 30 meV	51 ± 3	≈ 0	(1.0 ± 0.1)(-3)	
	→ 4.65	$\to 13/2^+$		13 ± 2	[0]	(7.7 ± 1.5)(-4)	
^{19}Ne	0.28 → 0	$1/2^- \to 1/2^+$	61 ± 3 ps	100	0	(1.0 ± 0.1)(-3)	
	1.51 → 0.24	$5/2^- \to 5/2^+$	1.6 ± 0.6 ps	12 ± 3	[0]	(5.0 ± 1.8)(-5)	
	1.62 → 0	$3/2^- \to 1/2^+$	145 ± 30 fs	20 ± 3	[0]	(4.3 ± 1.1)(-4)	
	→ 0.24	$\to 5/2^+$		10 ± 3	[0]	(3.5 ± 1.3)(-4)	
^{20}F	0.98 → 0	$1^- \to 2^+$	2.0 ± 0.2 ps	100	≈ 0	(7.0 ± 0.7)(-4)	
	1.31 → 0	$2^- \to 2^+$	1.16 ± 0.20 ps	100	≈ 0	(5.2 ± 1.0)(-4)	
	3.49 → 0.98	$1^+ \to 1^-$	44 ± 11 fs	7 ± 1	[0]	(1.3 ± 0.4)(-4)	
	→ 1.31	$\to 2^-$		10 ± 2	[0]	(2.9 ± 0.9)(-4)	
	→ 1.84	$\to 2^-$		8 ± 2	[0]	(5.2 ± 1.8)(-4)	
	6.63 → 0	$2^- \to 2^+$	1.4 ± 0.3 eV	2.0 ± 0.5	[0]	(2.0 ± 0.6)(-4)	
	→ 0.66	$\to 3^+$		6 ± 1	[0]	(9 ± 2)(-4)	
	→ 3.49	$\to 1^+$		3 ± 1	[0]	(2.8 ± 1.1)(-3)	
	6.65 → 1.06	$1^- \to 1^+$	1.6 ± 0.3 eV	9 ± 4	[0]	(1.7 ± 0.8)(-3)	
	→ 2.04	$\to 2^+$		59 ± 6	[0]	(2.0 ± 0.4)(-2)	
	→ 3.49	$\to 1^+$		14 ± 5	[0]	(1.5 ± 0.6)(-2)	
^{20}Ne	10.27 → 4.97	$2^+;1 \to 2^-$	4.8 ± 0.3 eV	1.3 ± 0.1	[0]	(8.4 ± 0.7)(-4)	
	→ 5.62	$\to 3^-$		2.1 ± 0.2	[0]	(2.0 ± 0.2)(-3)	
^{21}F	1.10 → 0.28	$(1/2,3/2)^- \to 1/2^+$	440 ± 80 fs	100	[0]	(5.3 ± 1.0)(-3)	
^{21}Ne	3.66 → 0.35	$3/2^- \to 5/2^+$	85 ± 15 fs	57 ± 2	≈ 0	(2.3 ± 0.4)(-4)	
	→ 2.80	$\to 1/2^+$		6 ± 2	[0]	(1.4 ± 0.5)(-3)	
	4.73 → 0.35	$3/2^- \to 5/2^+$	10 ± 4 fs	82 ± 2	[0]	(1.2 ± 0.5)(-3)	
	→ 2.80	$\to 1/2^+$		18 ± 2	[0]	(3.2 ± 1.3)(-3)	
	5.55 → 2.79	$3/2^+ \to 1/2^-$	40 ± 13 fs	9 ± 3	[0]	(1.4 ± 0.6)(-4)	
^{21}Na	2.80 → 2.43	$1/2^- \to 1/2^+$	110 ± 20 μeV	56 ± 4	0	(2.8 ± 0.5)(-3)	
	3.68 → 0.33	$3/2^- \to 5/2^+$	18 ± 5 meV	60 ± 3	[0]	(5.5 ± 1.5)(-4)	
	→ 2.43	$\to 1/2^+$		17 ± 2	[0]	(3.1 ± 0.9)(-3)	
	3.86 → 0	$5/2^- \to 3/2^+$	17 ± 5 meV	31 ± 5	[0]	(1.8 ± 0.6)(-4)	
	→ 0.33	$\to 5/2^+$		69 ± 5	[0]	(4.7 ± 1.4)(-4)	
	4.17 → 0.33	$3/2^- \to 5/2^+$	500 ± 150 meV	60 ± 3	[0]	(1.0 ± 0.3)(-2)	
	→ 2.43	$\to 1/2^+$		40 ± 3	[0]	(7 ± 2)(-2)	
^{22}Ne	5.15 → 1.27	$2^- \to 2^+$	1.2 ± 0.3 ps	53 ± 3	≈ 0	(9 ± 2)(-6)	
	→ 4.46	$\to 2^+$		47 ± 3	[0]	(1.5 ± 0.4)(-3)	
	5.91 → 1.27	$3^- \to 2^+$	51 ± 23 fs	84 ± 3	≈ 0	(2.0 ± 0.9)(-4)	
^{22}Na	2.21 → 0.66	$1^- \to 0^+;1$	21.5 ± 0.5 ps	98.0 ± 0.4	0	(1.5 ± 0.1)(-5)	
	3.52 → 1.95	$3^- \to 2^+;1$	670 ± 120 fs	50 ± 3	≈ 0	(2.4 ± 0.5)(-5)	
	5.96 → 0	$2^-;1 \to 3^+$	4.2 ± 1.2 fs	60 ± 2	[0]	(8 ± 2)(-4)	38
	→ 0.58	$\to 1^+$		26 ± 2	[0]	(4.9 ± 1.4)(-4)	38
	→ 3.06	$\to 2^+$		8 ± 1	[0]	(1.0 ± 0.3)(-3)	38
	→ 4.36	$\to 2^+$		6 ± 1	[0]	(4.3 ± 1.4)(-3)	38
	7.60 → 1.95	$2^- \to 2^+;1$	260 ± 60 meV	10 ± 1	[0]	(2.7 ± 0.6)(-4)	
^{23}Na	2.64 → 0	$1/2^- \to 3/2^+$	100 ± 20 fs	100	[0]	(6.7 ± 1.3)(-4)	
	3.68 → 0	$3/2^- \to 3/2^+$	32 ± 5 fs	2.2 ± 0.5	[0]	(1.7 ± 0.5)(-5)	
	→ 0.44	$\to 5/2^+$		7.9 ± 1	≈ 0	(8.5 ± 1.3)(-4)	

TABLE III. Strengths of Isospin-Allowed $E1$ Transitions ($E1_{IV}$)
See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)		S (W.u.)	References and remarks
^{23}Na	3.68 → 2.39	$3/2^- \rightarrow 1/2^+$	32 ± 5 fs	1.5 ± 0.4	[0]	(2.6 ± 0.8)(-4)	
	3.85 → 0	$5/2^- \rightarrow 3/2^+$	130 ± 20 fs	19 ± 3	[0]	(3.1 ± 0.7)(-5)	
	→ 0.44	$\rightarrow 5/2^+$		9 ± 3	≈ 0	(2.0 ± 0.7)(-5)	
	→ 2.08	$\rightarrow 7/2^+$		64 ± 4	≈ 0	(1.0 ± 0.2)(-3)	
	→ 2.98	$\rightarrow 3/2^+$		2.7 ± 0.7	[0]	(3.8 ± 1.0)(-4)	
	6.35 → 2.08	$9/2^- \rightarrow 7/2^+$	37 ± 12 fs	13 ± 3	[0]	(5 ± 2)(-5)	
	→ 2.70	$\rightarrow 9/2^+$		18 ± 3	[0]	(1.2 ± 0.4)(-4)	
	→ 5.53	$\rightarrow 11/2^+$		2.5 ± 0.6	[0]	(1.5 ± 0.6)(-3)	
	7.08 → 0	$3/2^- \rightarrow 3/2^+$	340 ± 70 as	56 ± 7	[0]	(5.9 ± 1.4)(-3)	
	→ 0.44	$\rightarrow 5/2^+$		28 ± 6	[0]	(3.5 ± 1.0)(-3)	
	8.66 → 2.64	$1/2^+;3/2 \rightarrow 1/2^-$	140 ± 30 as	7 ± 3	[0]	(2.7 ± 1.3)(-3)	
	9.61 → 2.64	$3/2^+ \rightarrow 1/2^-$	3 ± 1 eV	1.6	[0]	(2.6 ± 0.9)(-4)	
	→ 3.85	$\rightarrow 5/2^-$		1.8	[0]	(5.3 ± 1.8)(-4)	
	9.654 → 2.64	$1/2^+ \rightarrow 1/2^-$	900 meV	3.8	0	(1.8 ± 0.6)(-4)	
	→ 3.68	$\rightarrow 3/2^-$		28.8	[0]	(2.1 ± 0.7)(-3)	
	9.70 → 2.64	$3/2^+ \rightarrow 1/2^-$	2.5 ± 0.8 eV	8.0	[0]	(1.0 ± 0.3)(-3)	
	→ 3.68	$\rightarrow 3/2^-$		2.5	[0]	(5.2 ± 1.7)(-4)	
	9.83 → 3.85	$3/2^+ \rightarrow 5/2^-$	925 ± 225 meV	3.4	[0]	(2.6 ± 0.9)(-4)	
	9.85 → 2.64	$1/2^+ \rightarrow 1/2^-$	1.6 ± 0.4 eV	32	0	(2.5 ± 0.8)(-3)	
	→ 3.68	$\rightarrow 3/2^-$		11	[0]	(1.4 ± 0.5)(-3)	
	10.00 → 0	$1/2^- \rightarrow 3/2^+$	500 ± 150 meV	19	[0]	(1.7 ± 0.6)(-4)	
	→ 2.39	$\rightarrow 1/2^+$		12	0	(2.5 ± 0.8)(-4)	
	→ 4.43	$\rightarrow 1/2^+$		3.0	0	(1.6 ± 0.5)(-4)	
	10.01 → 3.68	$5/2^+ \rightarrow 3/2^-$	1.6 ± 0.5 eV	12	[0]	(1.4 ± 0.5)(-3)	
	→ 3.85	$\rightarrow 5/2^-$		5.5	[0]	(7 ± 2)(-4)	
	10.08 → 3.68	$1/2^+ \rightarrow 3/2^-$	350 ± 110 meV	6.3	[0]	(1.4 ± 0.5)(-3)	
	→ 6.92	$\rightarrow 3/2^-$		6.7	[0]	(1.3 ± 0.4)(-3)	
	10.23 → 3.68	$5/2^+ \rightarrow 3/2^-$	680 ± 200 meV	4.1	[0]	(1.2 ± 0.4)(-4)	
	10.24 → 2.64	$1/2^+ \rightarrow 1/2^-$	500 ± 150 meV	4.8	0	(1.0 ± 0.3)(-4)	
	→ 3.68	$\rightarrow 3/2^-$		34	[0]	(1.1 ± 0.4)(-3)	
	10.31 → 0	$3/2^- \rightarrow 3/2^+$	1.15 ± 0.35 eV	15	[0]	(2.8 ± 1.0)(-4)	
	→ 0.44	$\rightarrow 5/2^+$		34	[0]	(8 ± 3)(-4)	
	→ 2.98	$\rightarrow 3/2^+$		8.5	[0]	(4.5 ± 1.5)(-4)	
	→ 4.43	$\rightarrow 1/2^+$		14	[0]	(1.4 ± 0.5)(-3)	
	10.33 → 0	$1/2^- \rightarrow 3/2^+$	450 ± 140 meV	33	[0]	(2.4 ± 0.8)(-4)	
	→ 2.39	$\rightarrow 1/2^+$		15	0	(2.7 ± 0.9)(-4)	
	→ 2.98	$\rightarrow 3/2^+$		29	[0]	(6 ± 2)(-4)	
	→ 6.31	$\rightarrow 1/2^+$		3.6	0	(4.5 ± 1.5)(-4)	
	10.34 → 3.68	$5/2^+ \rightarrow 3/2^-$	700 ± 200 meV	1.5	[0]	(5.6 ± 1.9)(-5)	
	10.348 → 2.64	$3/2^+ \rightarrow 1/2^-$	700 ± 200 meV	34	[0]	(1.0 ± 0.3)(-3)	
	→ 3.68	$\rightarrow 3/2^-$		8.0	[0]	(3.4 ± 1.1)(-4)	
	→ 3.85	$\rightarrow 5/2^-$		30	[0]	(1.4 ± 0.5)(-3)	
	10.48 → 3.85	$3/2^+ \rightarrow 5/2^-$	580 ± 170 meV	2.4	[0]	(9 ± 3)(-5)	
	10.50 → 0	$3/2^- \rightarrow 3/2^+$	750 ± 230 meV	53	[0]	(4.8 ± 1.6)(-4)	
	→ 0.44	$\rightarrow 5/2^+$		25	[0]	(3.4 ± 1.1)(-4)	
	→ 2.39	$\rightarrow 1/2^+$		4.8	[0]	(1.2 ± 0.4)(-4)	
	→ 4.43	$\rightarrow 1/2^+$		1.0	[0]	(6 ± 2)(-5)	
	10.51 → 2.64	$1/2^+ \rightarrow 1/2^-$	250 ± 75 meV	29	0	(2.7 ± 0.9)(-4)	
	→ 3.68	$\rightarrow 3/2^-$		8.8	[0]	(1.3 ± 0.4)(-4)	
	→ 5.97	$\rightarrow 3/2^-$		2.8	[0]	(1.4 ± 0.5)(-4)	
	→ 6.92	$\rightarrow 3/2^-$		4.2	[0]	(4.1 ± 1.4)(-4)	
	→ 7.08	$\rightarrow 3/2^-$		5.9	[0]	(7 ± 2)(-4)	
	10.55 → 5.97	$5/2^+ \rightarrow 3/2^-$	800 ± 240 meV	2.8	[0]	(4.1 ± 1.3)(-4)	
	10.57 → 0.44	$3/2^- \rightarrow 5/2^+$	275 ± 85 meV	44	[0]	(2.1 ± 0.7)(-4)	
	→ 3.91	$\rightarrow 5/2^+$		3.1	[0]	(5.2 ± 1.7)(-5)	

TABLE III. Strengths of Isospin-Allowed $E1$ Transitions ($E1_{IV}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and remarks
^{23}Na	10.57 → 4.43	$3/2^- \rightarrow 1/2^+$	275 ± 85 meV	3.1	[0]	(7 ± 2)(-5)	
	→ 5.38	$\rightarrow 5/2^+$		1.8	[0]	(7 ± 2)(-5)	
^{23}Mg	2.77 → 0	$1/2^- \rightarrow 3/2^+$	155 ± 30 fs	100	[0]	(3.6 ± 0.7)(-4)	
^{24}Na	3.37 → 0.56	$2^- \rightarrow 2^+$	19 ± 5 fs	22 ± 2	[0]	(5.8 ± 1.6)(-4)	
	→ 1.347	$\rightarrow 1^+$		50 ± 3	[0]	(2.8 ± 0.7)(-3)	
	4.05 → 0.47	$0^- \rightarrow 1^+$	100 ± 40 fs	50 ± 10	0	(1.3 ± 0.6)(-4)	
	→ 1.347	$\rightarrow 1^+$		50 ± 10	0	(3.0 ± 1.3)(-4)	
	6.96 → 3.37	$1^+ \rightarrow 2^-$	380 ± 40 meV	9.0 ± 0.4	[0]	(1.3 ± 0.1)(-3)	
	→ 4.44	$\rightarrow 2^-$		10.9 ± 0.3	[0]	(4.6 ± 0.5)(-3)	
	→ 4.75	$\rightarrow 2^-$		2.2 ± 0.5	[0]	(1.4 ± 0.4)(-3)	
^{24}Mg	9.515 → 7.62	$4^+;1 \rightarrow 3^-$	25 ± 10 fs	2.0 ± 0.5	[0]	(1.4 ± 0.7)(-4)	44,48
^{25}Mg	3.97 → 0	$7/2^- \rightarrow 5/2^+$	28 ± 8 fs	79 ± 1	≈ 0	(5.2 ± 1.5)(-4)	
	→ 1.96	$\rightarrow 5/2^+$		21 ± 1	[0]	(1.0 ± 0.3)(-3)	
	5.79 → 3.45	$(7/2,11/2)^- \rightarrow 9/2^+$	65 ± 15 fs	66 ± 1	[0]	(9 ± 2)(-4)	
	7.41 → 0	$3/2^- \rightarrow 5/2^+$	5.0 ± 1.0 eV	18 ± 1	[0]	(3.8 ± 0.8)(-3)	
	→ 0.58	$\rightarrow 1/2^+$		67 ± 2	[0]	(1.8 ± 0.4)(-2)	
	→ 0.97	$\rightarrow 3/2^+$		2.5 ± 1.0	[0]	(1.3 ± 0.6)(-3)	
	→ 2.56	$\rightarrow 1/2^+$		12.5 ± 1.5	[0]	(9 ± 2)(-3)	
^{25}Al	3.06 → 0	$3/2^- \rightarrow 5/2^+$	360 ± 110 meV	13 ± 2	≈ 0	(2.8 ± 0.9)(-3)	
	→ 0.45	$\rightarrow 1/2^+$		77 ± 3	≈ 0	(2.7 ± 0.9)(-2)	
	→ 0.94	$\rightarrow 3/2^+$		10 ± 2	≈ 0	(7 ± 2)(-3)	
	3.70 → 0	$7/2^- \rightarrow 5/2^+$	52 ± 16 meV	30 ± 3	≈ 0	(5.3 ± 1.8)(-4)	
	→ 1.79	$\rightarrow 5/2^+$		67 ± 3	≈ 0	(9 ± 3)(-3)	
	→ 2.72	$\rightarrow 7/2^+$		3 ± 1	≈ 0	(8 ± 3)(-3)	
	3.82 → 0.45	$1/2^- \rightarrow 1/2^+$	1.0 ± 0.3 eV	31 ± 5	0	(1.5 ± 0.5)(-2)	
	→ 0.94	$\rightarrow 3/2^+$		61 ± 5	[0]	(4.6 ± 1.5)(-2)	
	3.86 → 3.06	$5/2^+ \rightarrow 3/2^-$	95 ± 30 meV	0.25 ± 0.08	[0]	(8 ± 3)(-4)	
^{26}Mg	6.88 → 2.94	$3^- \rightarrow 2^+$	120 ± 50 fs	72 ± 9	[0]	(1.1 ± 0.5)(-4)	
^{26}Al	4.94 → 0.23	$1^- \rightarrow 0^+;1$	110 ± 30 fs	90 ± 10	0	(9 ± 3)(-5)	
^{27}Mg	3.76 → 1.70	$7/2^- \rightarrow 5/2^+$	610 ± 100 fs	100	[0]	(2.0 ± 0.3)(-4)	
^{27}Al	6.48 → 0	$7/2^- \rightarrow 5/2^+$	21 ± 6 fs	59 ± 8	≈ 0	(1.1 ± 0.3)(-4)	
	→ 2.21	$\rightarrow 7/2^+$		29 ± 8	≈ 0	(6.5 ± 1.9)(-5)	
	→ 4.41	$\rightarrow 5/2^+$		12 ± 4	[0]	(7 ± 3)(-4)	
	6.65 → 0	$5/2^- \rightarrow 5/2^+$	1.3 ± 0.2 fs	84 ± 2	≈ 0	(2.4 ± 0.4)(-3)	
	→ 1.01	$\rightarrow 3/2^+$		9.9 ± 1.5	[0]	(4.6 ± 1.0)(-4)	
	→ 2.98	$\rightarrow 3/2^+$		6.1 ± 0.9	[0]	(1.0 ± 0.2)(-3)	
	9.08 → 4.05	$1/2^+ \rightarrow 1/2^-$	900 ± 300 meV	1.26 ± 0.09	0	(1.5 ± 0.5)(-4)	
	9.235 → 6.61	$1/2^+ \rightarrow (1/2,3/2)^-$	1.7 ± 0.5 eV	1.2	[0]	(1.8 ± 0.6)(-3)	56
	9.28 → 3.68	$3/2^- \rightarrow 1/2^+$	185 ± 50 meV	16	[0]	(2.8 ± 0.9)(-4)	56
	→ 4.41	$\rightarrow 5/2^+$		2.9	[0]	(8 ± 3)(-5)	56
	→ 5.25	$\rightarrow 5/2^+$		1.4	[0]	(7 ± 2)(-5)	56
	→ 6.78	$\rightarrow (3/2,5/2)^+$		2.0	[0]	(3.9 ± 1.3)(-4)	56
	→ 6.81	$\rightarrow 1/2^+;3/2$		1.8	[0]	(3.6 ± 1.2)(-4)	56
	9.40 → 6.61	$1/2^+ \rightarrow (1/2,3/2)^-$	450 ± 130 meV	1.9	[0]	(6 ± 2)(-4)	56
	9.627 → 0.84	$1/2^- \rightarrow 1/2^+$	2.2 ± 0.7 eV	44	0	(2.4 ± 0.8)(-3)	56
	→ 1.01	$\rightarrow 3/2^+$		34	[0]	(1.9 ± 0.6)(-3)	56
	→ 3.68	$\rightarrow 1/2^+$		1.3	0	(2.3 ± 0.8)(-4)	56
	→ 3.96	$\rightarrow 3/2^+$		5.0	[0]	(1.0 ± 0.3)(-3)	56
	9.83 → 1.01	$1/2^- \rightarrow 3/2^+$	750 ± 200 meV	11	[0]	(3.0 ± 1.0)(-4)	56
	→ 2.98	$\rightarrow 3/2^+$		38	[0]	(1.5 ± 0.5)(-3)	56
	→ 3.68	$\rightarrow 1/2^+$		1.8	0	(9 ± 3)(-5)	56
	→ 5.75	$\rightarrow 1/2^+$		2.8	0	(5.0 ± 1.7)(-4)	56
	→ 6.81	$\rightarrow 1/2^+;3/2$		9.5	0	(4.2 ± 1.4)(-3)	56
	9.85 → 5.16	$1/2^+ \rightarrow 3/2^-$	520 ± 160 meV	2.8	[0]	(2.4 ± 0.8)(-4)	56
	→ 6.16	$\rightarrow 3/2^-$		2.4	[0]	(4.0 ± 1.3)(-4)	56

TABLE III. Strengths of Isospin-Allowed $E1$ Transitions ($E1_{IV}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and remarks
^{27}Al	9.92 → 0	$3/2^- \rightarrow 5/2^+$	1.5 ± 0.4 eV	12	[0]	(3.0 ± 1.0)(-4)	56
	→ 0.84	$\rightarrow 1/2^+$		42	[0]	(1.4 ± 0.5)(-3)	56
	→ 1.01	$\rightarrow 3/2^+$		21	[0]	(7 ± 2)(-4)	56
	→ 2.73	$\rightarrow 5/2^+$		11	[0]	(7 ± 2)(-4)	56
	→ 3.96	$\rightarrow 3/2^+$		4.3	[0]	(4.9 ± 1.6)(-4)	56
	→ 4.41	$\rightarrow 5/2^+$		1.1	[0]	(1.6 ± 0.5)(-4)	56
	9.93 → 0.84	$1/2^- \rightarrow 1/2^+$	2.2 ± 0.7 eV	10	0	(4.9 ± 1.6)(-4)	56
	→ 1.01	$\rightarrow 3/2^+$		74	[0]	(3.9 ± 1.3)(-3)	56
	→ 3.68	$\rightarrow 1/2^+$		1.1	0	(1.6 ± 0.5)(-4)	56
	9.959 → 3.96	$5/2^- \rightarrow 3/2^+$	290 ± 90 meV	5.0	[0]	(1.1 ± 0.4)(-4)	56
	→ 4.58	$\rightarrow 7/2^+$		5.0	[0]	(1.5 ± 0.5)(-4)	56
	→ 5.25	$\rightarrow 5/2^+$		3.6	[0]	(1.5 ± 0.5)(-4)	56
	9.99 → 0	$7/2^- \rightarrow 5/2^+$	560 ± 170 meV	71	≈0	(7 ± 2)(-4)	56
	→ 3.00	$\rightarrow 9/2^+$		8.6	[0]	(2.2 ± 0.7)(-4)	56
	10.088 → 0.84	$3/2^- \rightarrow 1/2^+$	1.1 ± 0.3 eV	24	[0]	(5.6 ± 1.9)(-4)	56
	→ 1.01	$\rightarrow 3/2^+$		42	[0]	(1.0 ± 0.3)(-3)	56
	→ 3.68	$\rightarrow 3/2^+$		16	[0]	(1.1 ± 0.4)(-3)	56
	→ 6.81	$\rightarrow 1/2^+;3/2$		3.0	[0]	(1.5 ± 0.5)(-3)	56
^{28}Mg	5.17 → 1.47	$3^- \rightarrow 2^+$	170 ± 20 fs	71.2 ± 1.6	≈0	(8.9 ± 1.0)(-5)	
	→ 4.02	$\rightarrow 4^+$		26.7 ± 1.5	≈0	(1.1 ± 0.1)(-3)	
	→ 4.557	$\rightarrow 2^+$		2.1 ± 0.4	[0]	(5.8 ± 1.3)(-4)	
	5.70 → 5.27	$0^+ \rightarrow 1^-$	300 ± 50 fs	12.0 ± 1.0	0	(5.2 ± 0.9)(-3)	
^{28}Al	3.47 → 0	$4^- \rightarrow 3^+$	90 ± 12 fs	93 ± 3	[0]	(2.6 ± 0.4)(-4)	
	→ 2.27	$\rightarrow 4^+$		7 ± 3	[0]	(5 ± 2)(-4)	
	3.59 → 0	$3^- \rightarrow 3^+$	100 ± 20 fs	56 ± 7	[0]	(1.3 ± 0.3)(-4)	
	→ 0.03	$\rightarrow 2^+$		14 ± 5	[0]	(3.3 ± 1.4)(-5)	
	→ 1.01	$\rightarrow 3^+$		27 ± 5	[0]	(1.6 ± 0.4)(-4)	
	3.88 → 0	$2^- \rightarrow 3^+$	80 ± 20 fs	82 ± 8	[0]	(1.8 ± 0.5)(-4)	
	→ 1.620	$\rightarrow 1^+$		18 ± 8	[0]	(2.1 ± 1.0)(-4)	
	4.03 → 2.27	$5^-(3^-) \rightarrow 4^+$	140 ± 50 fs	49 ± 3	[0]	(7 ± 2)(-4)	
	4.69 → 0	$3^- \rightarrow 3^+$	50 ± 13 fs	64	[0]	(1.3 ± 0.4)(-4)	60
	→ 0.03	$\rightarrow 2^+$		36	[0]	(7 ± 2)(-5)	60
	4.77 → 0.03	$2^- \rightarrow 2^+$	50 ± 13 fs	73	[0]	(1.4 ± 0.5)(-4)	
	→ 2.14	$\rightarrow 2^+$		12	[0]	(1.4 ± 0.5)(-4)	
	5.14 → 0	$3^- \rightarrow 3^+$	40 ± 10 fs	90	[0]	(1.7 ± 0.6)(-4)	
	5.44 → 0.03	$(1,2)^- \rightarrow 2^+$	30 ± 10 fs	68	[0]	(1.5 ± 0.5)(-4)	
	→ 2.14	$\rightarrow 2^+$		32	[0]	(3.1 ± 1.0)(-4)	
^{28}Si	12.49 → 9.38	$3^- \rightarrow 2^+;1$	460 meV	3.5	[0]	(8 ± 3)(-4)	
	12.66 → 6.28	$4^-;1 \rightarrow 3^+$	610 meV	29	[0]	(1.1 ± 0.4)(-3)	
	→ 6.89	$\rightarrow 4^+$		5.0	[0]	(2.5 ± 0.8)(-4)	
	→ 8.59	$\rightarrow 3^+$		14	[0]	(2.0 ± 0.7)(-3)	
	13.05 → 1.78	$2^-;1 \rightarrow 2^+$	930 meV	76	[0]	(8 ± 3)(-4)	
	→ 7.80	$\rightarrow 3^+$		1.7	[0]	(1.7 ± 0.6)(-4)	
^{29}Si	3.62 → 2.03	$7/2^- \rightarrow 5/2^+$	4.2 ± 0.4 ps	89 ± 1	≈0	(5.4 ± 0.5)(-5)	
	→ 3.07	$\rightarrow 5/2^+$		9 ± 1	[0]	(1.3 ± 0.2)(-4)	
	4.93 → 0	$3/2^- \rightarrow 1/2^+$	1.22 ± 0.18 fs	94 ± 1	≈0	(6.6 ± 1.0)(-3)	
	→ 1.27	$\rightarrow 3/2^+$		5 ± 1	[0]	(9 ± 2)(-4)	
	→ 3.07	$\rightarrow 5/2^+$		0.8 ± 0.3	[0]	(1.0 ± 0.4)(-3)	
	6.38 → 0	$1/2^- \rightarrow 1/2^+$	520 ± 160 as	63 ± 3	0	(4.7 ± 1.5)(-3)	
	→ 1.27	$\rightarrow 3/2^+$		20 ± 2	[0]	(2.9 ± 1.0)(-3)	
	→ 2.43	$\rightarrow 3/2^+$		11 ± 1	[0]	(3.0 ± 1.0)(-3)	
	7.02 → 1.27	$5/2^- \rightarrow 3/2^+$	47 ± 19 fs	86 ± 10	[0]	(1.0 ± 0.4)(-4)	
^{29}P	4.34 → 0	$3/2^- \rightarrow 1/2^+$	1.7 ± 0.5 eV	91 ± 2	≈0	(2.9 ± 1.0)(-2)	
	→ 1.38	$\rightarrow 3/2^+$		9 ± 2	≈0	(9 ± 3)(-3)	
^{30}Si	5.49 → 2.24	$3^- \rightarrow 2^+$	90 ± 25 fs	61 ± 5	≈0	(2.0 ± 0.6)(-4)	

TABLE III. Strengths of Isospin-Allowed $E1$ Transitions ($E1_{IV}$)
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Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and remarks
^{30}Si	5.49 → 3.50	$3^- \rightarrow 2^+$	90 ± 25 fs	39 ± 5	≈ 0	(5.6 ± 1.7)(-4)	
	6.50 → 4.83	$4^- \rightarrow 3^+$	320 ± 95 fs	40 ± 5	[0]	(2.6 ± 0.8)(-4)	
	→ 5.23	$\rightarrow 3^+$		45 ± 5	[0]	(7 ± 2)(-4)	
	7.04 → 5.28	$5^- \rightarrow 4^+$	1.3 ± 0.3 ps	21 ± 4	[0]	(2.9 ± 0.9)(-5)	
	→ 5.95	$\rightarrow 4^+$		34 ± 3	[0]	(2.0 ± 0.5)(-4)	
^{30}P	4.14 → 2.94	$2^- \rightarrow 2^+;1$	50 ± 10 fs	5 ± 2	[0]	(6 ± 2)(-4)	
	4.62 → 2.94	$3^- \rightarrow 2^+;1$	240 ± 40 fs	24 ± 3	[0]	(2.1 ± 0.4)(-4)	
	6.93 → 0.68	$1^- \rightarrow 0^+;1$	1.6 ± 0.5 eV	66	0	(7 ± 2)(-3)	
	→ 4.47	$\rightarrow 0^+;1$		13	0	(2.1 ± 0.7)(-2)	
	→ 4.50	$\rightarrow 1^+;1$		3	[0]	(5.1 ± 1.7)(-3)	
^{31}Si	3.13 → 1.69	$7/2^- \rightarrow 5/2^+$	540 ± 110 fs	100	≈ 0	(6.4 ± 1.3)(-4)	
^{31}P	4.43 → 2.23	$7/2^- \rightarrow 5/2^+$	600 ± 100 fs	53 ± 3	≈ 0	(8.1 ± 1.4)(-5)	
	→ 3.30	$\rightarrow 5/2^+$		40 ± 2	≈ 0	(4.4 ± 0.7)(-4)	
	→ 3.41	$\rightarrow 7/2^+$		4.1 ± 0.8	[0]	(6.5 ± 1.6)(-5)	
	6.501 → 3.41	$9/2^- \rightarrow 7/2^+$	55 ± 17 fs	25 ± 5	[0]	(1.5 ± 0.6)(-4)	
	6.79 → 3.41	$9/2^- \rightarrow 7/2^+$	205 ± 40 fs	25 ± 8	≈ 0	(3.1 ± 1.3)(-5)	
	6.83 → 5.34	$11/2^- \rightarrow 9/2^+$	120 ± 50 fs	40 ± 10	≈ 0	(1.0 ± 0.4)(-3)	
	6.91 → 0	$3/2^- \rightarrow 1/2^+$	3.9 ± 0.8 fs	80 ± 5	[0]	(6.1 ± 1.3)(-4)	
	→ 2.23	$\rightarrow 5/2^+$		20 ± 5	[0]	(5.0 ± 1.6)(-4)	
	7.90 → 0	$1/2^- \rightarrow 1/2^+$	1.9 ± 0.6 eV	95	0	(5.5 ± 1.8)(-3)	
	→ 1.27	$\rightarrow 3/2^+$		1.4	[0]	(1.5 ± 0.5)(-4)	
	8.54 → 0	$1/2^- \rightarrow 1/2^+$	140 ± 40 meV	1.0	0	(3.3 ± 1.1)(-6)	
	→ 3.13	$\rightarrow 1/2^+$		52	0	(7 ± 2)(-4)	
	→ 4.26	$\rightarrow 3/2^+$		2.7	[0]	(7 ± 2)(-5)	
	→ 4.59	$\rightarrow 3/2^+$		2.3	[0]	(7 ± 2)(-5)	
	8.56 → 0	$3/2^- \rightarrow 1/2^+$	215 ± 65 meV	33	[0]	(1.7 ± 0.6)(-4)	
	→ 1.27	$\rightarrow 3/2^+$		15	[0]	(8 ± 3)(-5)	
	→ 2.23	$\rightarrow 5/2^+$		22	≈ 0	(2.7 ± 0.9)(-4)	
	→ 3.13	$\rightarrow 1/2^+$		9.8	[0]	(2.0 ± 0.7)(-4)	
	→ 5.26	$\rightarrow 1/2^+$		2.0	[0]	(1.8 ± 0.6)(-4)	
	8.576 → 5.99	$5/2^+ \rightarrow 3/2^-$	390 ± 120 meV	1.0	[0]	(3.3 ± 1.1)(-4)	
	8.584 → 0	$1/2^- \rightarrow 1/2^+$	135 ± 40 meV	32	0	(1.0 ± 0.3)(-4)	
	→ 3.51	$\rightarrow 3/2^+$		13	[0]	(2.0 ± 0.7)(-4)	
	→ 4.59	$\rightarrow 3/2^+$		26	[0]	(8 ± 3)(-4)	
	8.64 → 4.43	$5/2^+ \rightarrow 7/2^-$	510 ± 150 meV	3.9	[0]	(4.0 ± 1.3)(-4)	
	→ 5.99	$\rightarrow 3/2^-$		1.0	[0]	(4.1 ± 1.4)(-4)	
	8.84 → 2.23	$7/2^- \rightarrow 5/2^+$	47 ± 14 meV	9.6	≈ 0	(2.3 ± 0.8)(-5)	
	→ 3.41	$\rightarrow 7/2^+$		16	[0]	(7 ± 2)(-5)	
	→ 4.19	$\rightarrow 5/2^+$		5.1	[0]	(3.5 ± 1.2)(-5)	
	→ 4.78	$\rightarrow 5/2^+$		7.3	[0]	(7 ± 2)(-5)	
	→ 5.89	$\rightarrow 9/2^+$		4.2	[0]	(1.1 ± 0.4)(-5)	
	→ 6.93	$\rightarrow 5/2^+$		12	[0]	(1.2 ± 0.4)(-3)	
	8.90 → 5.99	$1/2^+ \rightarrow 3/2^-$	370 ± 110 meV	2.5	[0]	(5.5 ± 1.8)(-4)	
	8.91 → 4.43	$5/2^+ \rightarrow 7/2^-$	120 ± 35 meV	14	[0]	(2.8 ± 0.9)(-4)	
	→ 6.59	$\rightarrow 5/2^-$		4.4	[0]	(6 ± 2)(-4)	
	9.01 → 4.43	$5/2^+ \rightarrow 7/2^-$	400 ± 120 meV	4.1	[0]	(2.6 ± 0.9)(-4)	
	9.046 → 0	$3/2^- \rightarrow 1/2^+$	950 ± 300 meV	80	≈ 0	(1.5 ± 0.5)(-3)	
	→ 1.27	$\rightarrow 3/2^+$		9.4	[0]	(2.7 ± 0.9)(-4)	
	→ 3.13	$\rightarrow 1/2^+$		4.8	[0]	(3.3 ± 1.1)(-4)	
	→ 3.30	$\rightarrow 5/2^+$		1.0	[0]	(7 ± 2)(-5)	
	→ 4.59	$\rightarrow 3/2^+$		2.0	[0]	(3.2 ± 1.1)(-4)	
	9.07 → 4.43	$5/2^+ \rightarrow 7/2^-$	490 ± 150 meV	1.5	[0]	(1.1 ± 0.4)(-4)	
	→ 5.99	$\rightarrow 3/2^-$		1.5	[0]	(3.8 ± 1.3)(-4)	
	9.11 → 2.23	$7/2^- \rightarrow 5/2^+$	100 ± 30 meV	46	≈ 0	(2.1 ± 0.7)(-4)	
	→ 3.41	$\rightarrow 7/2^+$		18	[0]	(1.5 ± 0.5)(-4)	

TABLE III. Strengths of Isospin-Allowed $E1$ Transitions ($E1_{IV}$)
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Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and remarks
^{31}P	9.11 → 4.19	$7/2^- \rightarrow 5/2^+$	100 ± 30 meV	7.6	[0]	(9 ± 3)(-5)	
	→ 4.63	$\rightarrow 7/2^+$		2.4	[0]	(3.9 ± 1.3)(-5)	
	→ 4.78	$\rightarrow 5/2^+$		6.0	[0]	(1.1 ± 0.4)(-4)	
	→ 5.89	$\rightarrow 9/2^+$		3.0	[0]	(1.3 ± 0.4)(-4)	
	9.129 → 4.43	$5/2^+ \rightarrow 7/2^-$	85 ± 25 meV	4.9	[0]	(6 ± 2)(-5)	
	9.131 → 4.43	$5/2^+ \rightarrow 7/2^-$	200 ± 60 meV	16	[0]	(4.5 ± 1.5)(-4)	
	→ 6.61	$\rightarrow 3/2^-$		2.9	[0]	(4.4 ± 1.5)(-4)	
	→ 6.84	$\rightarrow (5/2,7/2)^-$		2.0	[0]	(5.4 ± 1.8)(-4)	
	9.18 → 0	$3/2^- \rightarrow 1/2^+$	290 ± 90 meV	49	≈ 0	(2.7 ± 0.9)(-4)	
	→ 1.27	$\rightarrow 3/2^+$		3.2	[0]	(2.8 ± 0.9)(-5)	
	→ 2.23	$\rightarrow 5/2^+$		9.9	≈ 0	(1.2 ± 0.4)(-4)	
	→ 3.30	$\rightarrow 5/2^+$		6.1	[0]	(1.2 ± 0.4)(-4)	
	→ 4.59	$\rightarrow 3/2^+$		2.0	[0]	(8 ± 3)(-5)	
	→ 5.56	$\rightarrow 3/2^+$		2.6	[0]	(2.3 ± 0.8)(-5)	
	9.23 → 0	$1/2^- \rightarrow 1/2^+$	400 ± 120 meV	10	0	(8 ± 3)(-5)	
	→ 1.27	$\rightarrow 3/2^+$		57	≈ 0	(7 ± 3)(-4)	
	→ 3.51	$\rightarrow 3/2^+$		4.7	[0]	(1.5 ± 0.5)(-4)	
	→ 6.38	$\rightarrow 3/2^+;3/2$		1.8	[0]	(4.6 ± 1.5)(-4)	
	→ 7.14	$\rightarrow 1/2^+;3/2$		1.3	0	(8 ± 3)(-4)	
	9.24 → 6.61	$3/2^+ \rightarrow 3/2^-$	430 ± 130 meV	1.2	[0]	(4.2 ± 1.4)(-4)	
	9.25 → 3.41	$7/2^- \rightarrow 7/2^+$	90 ± 30 meV	51	[0]	(3.4 ± 1.1)(-4)	
	→ 4.78	$\rightarrow 5/2^+$		2.6	[0]	(3.9 ± 1.3)(-5)	
	→ 5.34	$\rightarrow 9/2^+$		3.2	[0]	(7 ± 2)(-5)	
	→ 5.89	$\rightarrow 9/2^+$		7.5	[0]	(2.6 ± 0.9)(-4)	
	→ 6.05	$\rightarrow 7/2^+$		8.0	[0]	(3.3 ± 1.1)(-4)	
	9.29 → 0	$3/2^- \rightarrow 1/2^+$	330 ± 100 meV	48	+0.18 ± 0.02	(2.9 ± 1.0)(-4)	
	→ 2.23	$\rightarrow 5/2^+$		10	-0.18 ± 0.02	(1.4 ± 0.5)(-4)	
	→ 3.13	$\rightarrow 1/2^+$		19	≈ 0	(4.1 ± 1.4)(-4)	
	→ 3.51	$\rightarrow 3/2^+$		8.4	[0]	(2.2 ± 0.7)(-4)	
	→ 4.26	$\rightarrow 3/2^+$		5.3	[0]	(2.1 ± 0.7)(-4)	
	→ 5.26	$\rightarrow 1/2^+$		1.0	[0]	(8 ± 3)(-5)	
	→ 6.38	$\rightarrow 3/2^+;3/2$		1.2	[0]	(2.4 ± 0.8)(-4)	
	→ 7.14	$\rightarrow 1/2^+;3/2$		1.1	[0]	(5.4 ± 1.8)(-4)	
	9.41 → 2.23	$7/2^-;(3/2) \rightarrow 5/2^+$	1.4 ± 0.4 eV	2.9	[0]	(1.7 ± 0.6)(-4)	
	→ 4.78	$\rightarrow 5/2^+$		1.1	[0]	(2.3 ± 0.8)(-4)	
	→ 5.12	$\rightarrow 5/2^+$		1.0	[0]	(2.6 ± 0.9)(-4)	
	→ 5.34	$\rightarrow 9/2^+$		1.8	[0]	(5.6 ± 1.9)(-4)	
	9.44 → 5.99	$3/2^+ \rightarrow 3/2^-$	330 ± 100 meV	2.0	[0]	(2.4 ± 0.8)(-4)	
^{32}P	3.26 → 0.08	$2^- \rightarrow 2^+$	130 ± 30 fs	14 ± 2	[0]	(3.4 ± 0.9)(-5)	
	→ 1.15	$\rightarrow 1^+$		44.1 ± 1.5	≈ 0	(3.4 ± 0.8)(-4)	
	→ 1.32	$\rightarrow 2^+$		17.1 ± 1.1	[0]	(1.7 ± 0.4)(-4)	
	→ 1.75	$\rightarrow 3^+$		11.7 ± 0.8	[0]	(2.5 ± 0.6)(-4)	
	→ 2.23	$\rightarrow 1^+$		10.3 ± 0.9	[0]	(6.9 ± 1.6)(-4)	
	3.32 → 0.08	$3^- \rightarrow 2^+$	260 ± 70 fs	74.5 ± 1.9	≈ 0	(8 ± 2)(-5)	
	→ 1.32	$\rightarrow 2^+$		25.5 ± 1.9	[0]	(1.2 ± 0.3)(-4)	
	3.443 → 1.75	$4^- \rightarrow 3^+$	380 ± 80 fs	94.0 ± 1.2	≈ 0	(4.9 ± 1.0)(-4)	
	→ 2.18	$\rightarrow 3^+$		6.0 ± 1.2	≈ 0	(8 ± 2)(-5)	
	4.15 → 0.08	$3^- \rightarrow 2^+$	55 ± 20 fs	75.9 ± 1.4	≈ 0	(1.8 ± 0.7)(-4)	
	→ 2.22	$\rightarrow 2^+$		12 ± 2	[0]	(2.4 ± 0.9)(-4)	
	→ 2.66	$\rightarrow 2^+$		13.3 ± 1.0	[0]	(7 ± 3)(-4)	
	4.28 → 3.15	$5^- \rightarrow 4^+$	770 ± 120 fs	23.0 ± 1.2	≈ 0	(1.9 ± 0.3)(-4)	
	5.08 → 1.75	$(2,4)^- \rightarrow 3^+$	150 ± 50 fs	39 ± 3	[0]	(8 ± 3)(-4)	
^{32}S	9.49 → 7.12	$1^- \rightarrow 2^+;1$	370 meV	4.5	[0]	(1.8 ± 0.6)(-3)	
	10.08 → 2.23	$2^-;1 \rightarrow 2^+$	1.0 eV	34	[0]	(1.0 ± 0.3)(-3)	
	→ 4.28	$\rightarrow 2^+$		2.0	[0]	(1.5 ± 0.5)(-4)	

TABLE III. Strengths of Isospin-Allowed $E1$ Transitions ($E1_{IV}$)
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Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and remarks
^{32}S	10.08 → 5.41	$2^-;1 \rightarrow 3^+$	1.0 eV	4	[0]	(5.7 ± 1.9)(-4)	
^{33}P	4.23 → 1.85	$7/2^- \rightarrow 5/2^+$	450 ± 70 fs	89 ± 2	≈ 0	(1.6 ± 0.3)(-4)	
	→ 3.49	$\rightarrow 5/2^+$		11 ± 2	[0]	(5.9 ± 1.4)(-4)	
^{33}S	2.93 → 1.97	$7/2^- \rightarrow 5/2^+$	41 ± 2 ps	54 ± 2	≈ 0	(1.4 ± 0.1)(-5)	
	3.22 → 0	$3/2^- \rightarrow 3/2^+$	40 ± 12 fs	38 ± 1	≈ 0	(2.7 ± 0.8)(-4)	
	→ 0.84	$\rightarrow 1/2^+$		62 ± 1	≈ 0	(1.1 ± 0.3)(-3)	
	4.048 → 2.93	$9/2^+ \rightarrow 7/2^-$	305 ± 50 fs	3 ± 1	[0]	(7 ± 2)(-5)	
	4.21 → 0.84	$3/2^- \rightarrow 1/2^+$	46 ± 7 fs	93 ± 2	≈ 0	(5.2 ± 0.8)(-4)	
	→ 2.31	$\rightarrow 3/2^+$		7 ± 2	[0]	(2.1 ± 0.7)(-4)	
	4.73 → 2.97	$9/2^- \rightarrow 7/2^+$	82 ± 13 fs	82 ± 1	≈ 0	(1.7 ± 0.3)(-3)	
	8.67 → 0	$3/2^- \rightarrow 3/2^+$	400 ± 100 meV	5.0 ± 1.5	[0]	(5 ± 2)(-5)	
	→ 0.84	$\rightarrow 1/2^+$		48 ± 3	[0]	(6.9 ± 1.7)(-4)	
	→ 1.97	$\rightarrow 5/2^+$		4 ± 1	[0]	(9 ± 3)(-5)	
	→ 2.31	$\rightarrow 3/2^+$		4 ± 1	[0]	(1.1 ± 0.4)(-4)	
^{33}Cl	4.12 → 0	$3/2^- \rightarrow 3/2^+$	700 ± 200 meV	30 ± 4	[0]	(4.3 ± 1.4)(-3)	
	→ 0.81	$\rightarrow 1/2^+$		69 ± 4	[0]	(1.9 ± 0.6)(-2)	
	4.44 → 2.85	$1/2^+ \rightarrow 3/2^-$	220 ± 70 meV	1.2 ± 0.4	[0]	(9 ± 4)(-4)	
	4.78 → 2.84	$7/2^- \rightarrow 5/2^+$	1.6 ± 0.5 meV	53 ± 5	[0]	(1.6 ± 0.5)(-4)	
	5.00 → 0	$3/2^- \rightarrow 3/2^+$	600 ± 180 meV	46	[0]	(3.1 ± 1.0)(-3)	
	→ 0.81	$\rightarrow 1/2^+$		41	[0]	(4.8 ± 1.6)(-3)	
	→ 1.99	$\rightarrow 5/2^+$		4	[0]	(1.2 ± 0.4)(-3)	
	→ 2.35	$\rightarrow 3/2^+$		9	[0]	(4.2 ± 1.4)(-3)	
	5.28 → 0	$5/2^- \rightarrow 3/2^+$	330 ± 100 meV	68	[0]	(2.1 ± 0.7)(-3)	
	→ 1.99	$\rightarrow 5/2^+$		17	[0]	(2.2 ± 0.7)(-3)	
	→ 2.35	$\rightarrow 3/2^+$		15	[0]	(2.9 ± 1.0)(-3)	
^{34}S	4.62 → 2.13	$3^- \rightarrow 2^+$	130 ± 15 fs	24 ± 3	≈ 0	(1.1 ± 0.2)(-4)	
	→ 3.30	$\rightarrow 2^+$		76 ± 3	≈ 0	(2.3 ± 0.3)(-3)	
	5.32 → 2.13	$2^- \rightarrow 2^+$	24 ± 10 fs	100	≈ 0	(1.2 ± 0.5)(-3)	
	5.68 → 2.13	$2^- \rightarrow 2^+$	380 ± 65 fs	30 ± 3	+0.47±0.09	(1.3 ± 0.3)(-5)	
	→ 3.30	$\rightarrow 2^+$		50 ± 5	[0]	(9.0 ± 1.7)(-5)	
	5.69 → 4.69	$5^- \rightarrow 4^+$	54 ± 2 ps	52 ± 2	≈ 0	(9.0 ± 0.5)(-6)	
	6.86 → 4.69	$5^- \rightarrow 4^+$	39 ± 9 fs	55 ± 3	≈ 0	(1.3 ± 0.3)(-3)	
^{34}Cl	3.77 → 0	$1^- \rightarrow 0^+;1$	115 ± 30 fs	100	0	(1.6 ± 0.4)(-4)	
	3.98 → 2.16	$3^- \rightarrow 2^+;1$	160 ± 60 fs	29 ± 2	≈ 0	(2.8 ± 1.0)(-4)	
	4.35 → 0	$1^- \rightarrow 0^+;1$	65 ± 20 fs	67 ± 2	0	(1.2 ± 0.4)(-4)	
	→ 2.16	$\rightarrow 2^+;1$		24 ± 2	[0]	(3.1 ± 0.9)(-4)	
	6.17 → 0.15	$3^-;1 \rightarrow 3^+$	130 ± 40 meV	25	≈ 0	(2.1 ± 0.7)(-4)	
	→ 1.23	$\rightarrow 2^+$		4	[0]	(6 ± 2)(-5)	
	→ 1.89	$\rightarrow 2^+$		3	[0]	(7 ± 2)(-5)	
	→ 2.18	$\rightarrow 3^+$		5	[0]	(1.4 ± 0.5)(-4)	
	→ 2.61	$\rightarrow 3^+$		2	[0]	(8 ± 3)(-5)	
	6.64 → 0.15	$4^-;1 \rightarrow 3^+$	260 ± 80 meV	22	≈ 0	(2.9 ± 1.0)(-4)	
	→ 2.38	$\rightarrow 4^+$		6	≈ 0	(2.8 ± 0.9)(-4)	
	→ 2.61	$\rightarrow 3^+$		6	≈ 0	(3.3 ± 1.1)(-4)	
	6.87 → 2.38	$5^-;1 \rightarrow 4^+$	90 ± 25 meV	8	≈ 0	(1.0 ± 0.3)(-4)	
^{35}S	2.35 → 0	$3/2^- \rightarrow 3/2^+$	1.29 ± 0.18 ps	73 ± 1	≈ 0	(3.9 ± 0.6)(-5)	
	→ 1.57	$\rightarrow 1/2^+$		27 ± 1	[0]	(3.8 ± 0.6)(-4)	
^{35}Cl	3.16 → 1.76	$7/2^- \rightarrow 5/2^+$	41.8 ± 1.1 ps	0.30 ± 0.04	-0.44±0.12	(2.0 ± 0.3)(-8)	
	→ 2.65	$\rightarrow 7/2^+$		8 ± 1	[0]	(1.3 ± 0.2)(-5)	
	→ 3.00	$\rightarrow 5/2^+$		1.7 ± 0.2	[0]	(9.0 ± 1.1)(-5)	
	4.06 → 1.22	$3/2^- \rightarrow 1/2^+$	22 ± 4 fs	94 ± 2	[0]	(1.7 ± 0.3)(-3)	
	→ 1.76	$\rightarrow 5/2^+$		4.8 ± 1.5	[0]	(1.6 ± 0.6)(-4)	
	→ 2.69	$\rightarrow 3/2^+$		1.2 ± 0.4	[0]	(1.9 ± 0.7)(-4)	
	4.17 → 0	$5/2^- \rightarrow 3/2^+$	34 ± 9 fs	58 ± 6	[0]	(2.1 ± 0.6)(-4)	
	→ 1.76	$\rightarrow 5/2^+$		16 ± 4	[0]	(3.0 ± 1.1)(-4)	

TABLE III. Strengths of Isospin-Allowed $E1$ Transitions ($E1_{IV}$)
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Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and remarks
^{35}Cl	4.17 → 2.69	$5/2^- \rightarrow 3/2^+$	34 ± 9 fs	26 ± 5	[0]	(2.1 ± 0.7)(-3)	
	4.18 → 0	$3/2^- \rightarrow 3/2^+$	55 ± 12 fs	61 ± 4	≈ 0	(1.4 ± 0.3)(-4)	
	→ 1.22	$\rightarrow 1/2^+$		31 ± 4	≈ 0	(2.1 ± 0.5)(-4)	
	→ 2.69	$\rightarrow 3/2^+$		8 ± 2	[0]	(4.0 ± 1.3)(-4)	
	7.20 → 1.22	$1/2^- \rightarrow 1/2^+$	300 ± 90 meV	67	0	(1.3 ± 0.4)(-3)	
	→ 2.69	$\rightarrow 3/2^+$		1.1	[0]	(5.0 ± 1.7)(-5)	
	→ 3.92	$\rightarrow 3/2^+$		4	[0]	(4.6 ± 1.5)(-4)	
	→ 3.97	$\rightarrow 1/2^+$		1.8	0	(2.3 ± 0.8)(-4)	
	7.27 → 0	$1/2^- \rightarrow 3/2^+$	500 ± 150 meV	69	[0]	(1.2 ± 0.4)(-3)	
	→ 1.22	$\rightarrow 1/2^+$		24	0	(7 ± 2)(-4)	
	→ 2.69	$\rightarrow 3/2^+$		1.1	[0]	(8 ± 3)(-5)	
	7.55 → 3.00	$7/2^-;3/2 \rightarrow 5/2^+$	1.3 ± 0.1 eV	2	[0]	(3.8 ± 1.3)(-4)	
	7.80 → 0	$3/2^- \rightarrow 3/2^+$	175 ± 50 meV	83	+0.33±0.02	(3.8 ± 1.3)(-4)	
	→ 1.22	$\rightarrow 1/2^+$		9	-0.21±0.04	(7 ± 2)(-5)	
	→ 5.65	$\rightarrow 3/2^+;3/2$		1.3	[0]	(3.2 ± 1.1)(-4)	
	8.01 → 3.16	$5/2^+ \rightarrow 7/2^-$	370 ± 110 meV	15	[0]	(7 ± 2)(-4)	
	8.24 → 1.22	$3/2^- \rightarrow 1/2^+$	250 ± 75 meV	91	[0]	(9 ± 3)(-4)	
	→ 3.00	$\rightarrow 5/2^+$		2	[0]	(4.8 ± 1.6)(-5)	
	8.27 → 3.16	$5/2^+ \rightarrow 7/2^-$	100 ± 30 meV	5.3	[0]	(5.5 ± 1.8)(-5)	
	→ 4.18	$\rightarrow 3/2^-$		16	[0]	(3.2 ± 1.1)(-4)	
	8.278 → 4.06	$5/2^+ \rightarrow 3/2^-$	115 ± 35 meV	1.4	[0]	(2.9 ± 1.0)(-5)	
	→ 4.17	$\rightarrow 5/2^-$		1.5	[0]	(3.4 ± 1.1)(-5)	
	→ 4.18	$\rightarrow 3/2^-$		1.0	[0]	(2.3 ± 0.8)(-5)	
	→ 5.17	$\rightarrow 7/2^-$		2.9	[0]	(1.5 ± 0.5)(-4)	
	8.29 → 1.22	$3/2^- \rightarrow 1/2^+$	225 ± 70 meV	48	[0]	(4.2 ± 1.4)(-4)	
	→ 2.69	$\rightarrow 3/2^+$		20	[0]	(3.5 ± 1.2)(-4)	
	→ 3.92	$\rightarrow 3/2^+$		1.0	[0]	(3.7 ± 1.2)(-5)	
	→ 3.97	$\rightarrow 1/2^+$		2.9	[0]	(1.1 ± 0.4)(-4)	
	→ 5.65	$\rightarrow 3/2^+;3/2$		2.1	[0]	(3.5 ± 1.2)(-4)	
	8.40 → 1.76	$5/2^- \rightarrow 5/2^+$	115 ± 35 meV	43	[0]	(2.3 ± 0.8)(-4)	
	→ 3.00	$\rightarrow 5/2^+$		15	[0]	(1.5 ± 0.5)(-4)	
	→ 4.11	$\rightarrow 7/2^+$		1.4	[0]	(2.8 ± 0.9)(-5)	
	8.487 → 0	$3/2^- \rightarrow 3/2^+$	475 ± 140 meV	46	[0]	(4.6 ± 1.5)(-4)	
	→ 1.22	$\rightarrow 1/2^+$		6.6	[0]	(1.1 ± 0.4)(-4)	
	→ 1.76	$\rightarrow 5/2^+$		3.6	[0]	(8 ± 3)(-5)	
	→ 2.69	$\rightarrow 3/2^+$		19	[0]	(6 ± 2)(-4)	
	→ 3.00	$\rightarrow 5/2^+$		8.3	[0]	(3.2 ± 1.1)(-4)	
	→ 3.97	$\rightarrow 1/2^+$		7.1	[0]	(5.1 ± 1.7)(-4)	
	8.52 → 0	$1/2^- \rightarrow 3/2^+$	250 ± 75 meV	27	[0]	(1.4 ± 0.5)(-4)	
	→ 1.22	$\rightarrow 1/2^+$		10	0	(9 ± 3)(-5)	
	→ 3.92	$\rightarrow 3/2^+$		6.6	[0]	(2.3 ± 0.8)(-4)	
	→ 3.97	$\rightarrow 1/2^+$		23	0	(8 ± 3)(-4)	
	8.57 → 5.16	$5/2^+ \rightarrow 7/2^-$	480 ± 140 meV	1.8	[0]	(1.6 ± 0.5)(-4)	
	8.58 → 4.06	$1/2^+ \rightarrow 3/2^-$	500 ± 150 meV	2.0	[0]	(1.5 ± 0.5)(-4)	
	→ 4.18	$\rightarrow 3/2^-$		4.4	[0]	(3.5 ± 1.2)(-4)	
	8.591 → 3.16	$5/2^+ \rightarrow 7/2^-$	115 ± 35 meV	7.7	[0]	(8 ± 3)(-5)	
	→ 4.17	$\rightarrow 5/2^-$		13	[0]	(2.4 ± 0.8)(-4)	
	8.615 → 4.06	$5/2^+ \rightarrow 3/2^-$	400 ± 120 meV	5.4	[0]	(3.1 ± 1.0)(-4)	
	8.63 → 1.76	$7/2^- \rightarrow 5/2^+$	340 ± 100 meV	47	≈ 0	(7 ± 2)(-4)	
	→ 2.65	$\rightarrow 7/2^+$		2.6	[0]	(5.7 ± 1.9)(-5)	
	→ 3.94	$\rightarrow 9/2^+$		9.6	[0]	(4.3 ± 1.4)(-4)	
	→ 4.11	$\rightarrow 7/2^+$		9.7	≈ 0	(4.9 ± 1.6)(-4)	
	8.687 → 0	$5/2^- \rightarrow 3/2^+$	370 ± 110 meV	76	[0]	(5.8 ± 1.9)(-4)	
	→ 1.76	$\rightarrow 5/2^+$		4.8	[0]	(7 ± 2)(-5)	
	→ 2.69	$\rightarrow 3/2^+$		2.8	[0]	(7 ± 2)(-5)	

TABLE III. Strengths of Isospin-Allowed $E1$ Transitions ($E1_{IV}$)
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Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and remarks
^{35}Cl	8.70 → 0	$3/2^- \rightarrow 3/2^+$	150 ± 45 meV	80	[0]	(2.5 ± 0.8)(-4)	
	8.75 → 0	$3/2^- \rightarrow 3/2^+$	425 ± 130 meV	53	[0]	(4.6 ± 1.5)(-4)	
	→ 1.76	$\rightarrow 5/2^+$		30	[0]	(5.1 ± 1.7)(-4)	
	→ 2.69	$\rightarrow 3/2^+$		3.0	[0]	(8 ± 3)(-5)	
	8.78 → 1.76	$3/2^- \rightarrow 5/2^+$	425 ± 130 meV	6.7	[0]	(1.1 ± 0.4)(-4)	
	→ 2.69	$\rightarrow 3/2^+$		12	[0]	(3.1 ± 1.0)(-4)	
	→ 3.09	$\rightarrow 5/2^+$		27	[0]	(8 ± 3)(-4)	
	→ 3.92	$\rightarrow 3/2^+$		4.2	[0]	(2.1 ± 0.7)(-4)	
	9.08 → 3.16	$5/2^+;(3/2) \rightarrow 7/2^-$	2.7 ± 0.8 eV	6.0	[0]	(1.1 ± 0.4)(-3)	
	→ 4.17	$\rightarrow 5/2^-$		1.5	[0]	(4.7 ± 1.6)(-4)	
	→ 4.18	$\rightarrow 3/2^-$		1.5	[0]	(4.7 ± 1.6)(-4)	
^{36}S	4.19 → 3.29	$3^- \rightarrow 2^+$	1.10 ± 0.45 ps	100	≈0	(1.1 ± 0.5)(-3)	
^{36}Cl	1.95 → 0	$2^- \rightarrow 2^+$	2.6 ± 0.3 ps	63 ± 2	≈0	(3.0 ± 0.3)(-5)	
	→ 0.79	$\rightarrow 3^+$		5 ± 2	[0]	(1.1 ± 0.5)(-5)	
	→ 1.16	$\rightarrow 1^+$		32 ± 2	[0]	(2.2 ± 0.3)(-4)	
	2.81 → 0.79	$4^- \rightarrow 3^+$	4.1 ± 0.8 ps	51 ± 1	≈0	(1.3 ± 0.3)(-5)	
	2.90 → 0	$(2,3)^- \rightarrow 2^+$	860 ± 150 fs	38 ± 6	[0]	(1.6 ± 0.4)(-5)	
	→ 1.96	$\rightarrow 2^+$		54 ± 6	[0]	(6.6 ± 1.3)(-4)	
	2.99 → 0	$(1\text{-}3)^- \rightarrow 2^+$	90 ± 18 fs	80 ± 2	[0]	(2.9 ± 0.6)(-4)	
	→ 1.96	$\rightarrow 2^+$		9 ± 2	[0]	(8 ± 2)(-4)	
	3.21 → 0.79	$2^- \rightarrow 3^+$	140 ± 30 fs	51 ± 6	[0]	(2.2 ± 0.5)(-4)	
	→ 1.16	$\rightarrow 1^+$		49 ± 6	[0]	(3.6 ± 0.9)(-4)	
	3.33 → 1.60	$2^- \rightarrow 1^+(2^+)$	105 ± 20 fs	27 ± 6	[0]	(4.4 ± 1.3)(-4)	
	→ 1.96	$\rightarrow 2^+$		39 ± 6	[0]	(1.3 ± 0.3)(-3)	
	→ 2.86	$\rightarrow (2,3)^+$		10 ± 2	[0]	(8 ± 2)(-3)	
	3.60 → 0	$3^- \rightarrow 2^+$	60 ± 20 fs	17 ± 2	[0]	(5.3 ± 1.8)(-5)	
	→ 1.96	$\rightarrow 2^+$		15.7 ± 0.9	[0]	(5.3 ± 1.8)(-4)	
	4.00 → 1.16	$(1,2)^- \rightarrow 1^+$	30 ± 10 fs	20 ± 5	[0]	(2.6 ± 1.1)(-4)	
	→ 1.96	$\rightarrow 2^+$		80 ± 5	[0]	(2.8 ± 1.0)(-3)	
	5.313 → 4.29	$7^+ \rightarrow 6^-$	29 ± 2 fs	56.2 ± 1.1	≈0	(1.6 ± 0.1)(-5)	
	8.579 → 1.95	$2^+ \rightarrow 2^-$		4.9 ± 0.2	[0]	(1.1 ± 0.1)(-4)	
	→ 2.47	$\rightarrow 3^-$		21.1 ± 0.9	≈0	(6.2 ± 0.4)(-4)	
	→ 3.60	$\rightarrow 3^-$		3.8 ± 0.2	[0]	(2.1 ± 0.1)(-4)	
	→ 3.64	$\rightarrow 1^-$		0.8 ± 0.3	[0]	(4.5 ± 1.7)(-5)	
	→ 3.96	$\rightarrow (1,2)^-$		0.70 ± 0.07	[0]	(4.8 ± 0.5)(-5)	
	→ 4.14	$\rightarrow (1\text{-}3)^-$		1.08 ± 0.06	[0]	(8.3 ± 0.6)(-5)	
	→ 4.50	$\rightarrow (1,2)^-$		0.72 ± 0.05	[0]	(7.2 ± 0.6)(-5)	
	→ 4.60	$\rightarrow 3^-$		0.98 ± 0.07	[0]	(1.0 ± 0.1)(-4)	
	→ 4.76	$\rightarrow 3^-$		1.06 ± 0.07	[0]	(1.3 ± 0.1)(-4)	
	→ 4.84	$\rightarrow 3^-$		0.17 ± 0.04	[0]	(2.2 ± 0.5)(-5)	
	→ 4.96	$\rightarrow (1,2)^-$		0.16 ± 0.02	[0]	(2.3 ± 0.3)(-5)	
	→ 5.00	$\rightarrow 3^-$		0.21 ± 0.08	[0]	(3.1 ± 1.2)(-5)	
	→ 5.08	$\rightarrow (1\text{-}3)^-$		0.26 ± 0.03	[0]	(4.1 ± 0.5)(-5)	
	→ 5.15	$\rightarrow (1\text{-}3)^-$		0.87 ± 0.06	[0]	(1.4 ± 0.1)(-4)	
	→ 5.20	$\rightarrow (2,3)^-$		0.51 ± 0.12	[0]	(9 ± 2)(-5)	
	→ 5.307	$\rightarrow (2,3)^-$		0.13 ± 0.04	[0]	(2.5 ± 0.8)(-5)	
	→ 5.46	$\rightarrow (1,2)^-$		0.96 ± 0.08	[0]	(2.1 ± 0.2)(-4)	
	→ 5.52	$\rightarrow 3^-$		3.8 ± 0.3	[0]	(8.9 ± 0.8)(-4)	
	→ 5.63	$\rightarrow (1\text{-}3)^-$		0.18 ± 0.03	[0]	(4.7 ± 0.8)(-5)	
	→ 5.70	$\rightarrow (1\text{-}3)^-$		0.61 ± 0.12	[0]	(1.7 ± 0.3)(-4)	
	→ 5.73	$\rightarrow (2,3)^-$		1.26 ± 0.06	[0]	(3.7 ± 0.2)(-4)	
	→ 5.777	$\rightarrow (2,3)^-$		0.63 ± 0.11	[0]	(1.9 ± 0.3)(-4)	
	→ 5.84	$\rightarrow 3^-$		0.15 ± 0.03	[0]	(4.9 ± 1.0)(-5)	
	→ 6.49	$\rightarrow (1\text{-}3)^-$		0.37 ± 0.06	[0]	(2.8 ± 0.5)(-4)	
	8.580 → 1.96	$3^-(2^-) \rightarrow 2^+$	300 ± 40 meV	14.4 ± 1.5	[0]	(2.0 ± 0.3)(-4)	

TABLE III. Strengths of Isospin-Allowed $E1$ Transitions ($E1_{IV}$)

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Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and remarks
^{36}Cl	8.580 → 2.86	$3^-(2^-) \rightarrow (2,3)^+$	300 ± 40 meV	3.6 ± 0.3	[0]	(7.8 ± 1.2)(-5)	
^{36}Ar	6.61 → 4.18	$2^+;1 \rightarrow 3^-$	22 ± 9 fs	74 ± 2	[0]	(1.0 ± 0.4)(-2)	
^{37}Cl	10.22 → 4.81	$7/2^-;5/2 \rightarrow 5/2^+$	3.6 ± 1.1 eV	9	[0]	(2.7 ± 0.9)(-3)	
^{37}Ar	2.49 → 0	$3/2^- \rightarrow 3/2^+$	810 ± 150 fs	93.0 ± 0.5	≈ 0	(6.3 ± 1.2)(-5)	
	3.27 → 0	$5/2^- \rightarrow 3/2^+$	45 ± 8 fs	45 ± 2	≈ 0	(2.5 ± 0.4)(-4)	
	3.53 → 2.80	$7/2^- \rightarrow 5/2^+$	590 ± 110 fs	8 ± 1	≈ 0	(3.1 ± 0.7)(-4)	
	4.02 → 2.22	$9/2^- \rightarrow 7/2^+$	40 ± 15 fs	68.1 ± 1.4	≈ 0	(2.5 ± 0.9)(-3)	
	5.21 → 3.19	$11/2^+ \rightarrow 9/2^-$	3.6 ± 0.3 ps	19 ± 1	≈ 0	(5.7 ± 0.6)(-6)	
	→ 3.71	$\rightarrow 11/2^-$		41 ± 2	≈ 0	(2.9 ± 0.3)(-5)	
	→ 4.02	$\rightarrow 9/2^-$		11 ± 2	≈ 0	(2.6 ± 0.3)(-5)	
	6.47 → 5.79	$15/2^+ \rightarrow 13/2^-$	6.8 ± 0.5 ps	30 ± 3	≈ 0	(1.2 ± 0.2)(-4)	
^{37}K	3.32 → 0	$3/2^- \rightarrow 3/2^+$	16 ± 2 meV	5 ± 2	[0]	(2.9 ± 1.3)(-5)	
	→ 1.37	$\rightarrow 1/2^+$		95 ± 2	[0]	(2.7 ± 0.3)(-3)	
^{38}Ar	3.81 → 2.17	$3^- \rightarrow 2^+$	80 ± 20 fs	≈ 100	≈ 0	(2.5 ± 0.6)(-3)	
	4.57 → 3.81	$2^+ \rightarrow 3^-$	60 ± 12 fs	2.0 ± 0.3	[0]	(6.5 ± 1.6)(-4)	
	4.88 → 2.17	$3^- \rightarrow 2^+$	60 ± 20 fs	46 ± 2	≈ 0	(3.3 ± 1.1)(-4)	
	5.08 → 2.17	$(1\text{-}3)^- \rightarrow 2^+$	82 ± 25 fs	94 ± 2	[0]	(4.0 ± 1.2)(-4)	
	5.16 → 3.81	$2^+ \rightarrow 3^-$	31 ± 9 fs	12.7 ± 1.6	[0]	(1.4 ± 0.4)(-3)	
	5.35 → 3.81	$4^+ \rightarrow 3^-$	200 ± 40 fs	9.0 ± 1.3	[0]	(1.1 ± 0.3)(-4)	
	5.51 → 2.17	$3^- \rightarrow 2^+$	280 ± 50 fs	29 ± 3	[0]	(2.3 ± 0.5)(-5)	
	6.41 → 4.59	$6^+ \rightarrow 5^-$	1.5 ± 0.4 ps	100	≈ 0	(8 ± 2)(-5)	
	7.288 → 4.59	$(4,6)^+ \rightarrow 5^-$	77 ± 30 fs	20 ± 3	[0]	(1.1 ± 0.5)(-4)	
	10.17 → 8.57	$9^- \rightarrow 8^+$	6 ± 2 ps	52 ± 2	≈ 0	(1.8 ± 0.6)(-5)	
^{38}K	2.83 → 0.13	$1^- \rightarrow 0^+;1$	240 ± 50 fs	90 ± 3	0	(1.6 ± 0.3)(-4)	
	→ 2.40	$\rightarrow 2^+;1$		10 ± 3	[0]	(4.5 ± 1.6)(-3)	
	2.87 → 2.40	$2^- \rightarrow 2^+;1$	4.5 ± 1.2 ps	16 ± 5	[0]	(2.9 ± 1.2)(-4)	
^{39}Ar	1.52 → 1.27	$3/2^+ \rightarrow 3/2^-$	1.37 ± 0.07 ns	54.1 ± 1.2	≈ 0	(2.1 ± 0.1)(-5)	
	2.43 → 1.52	$3/2^- \rightarrow 3/2^+$	$1.00 \pm {}^{0.45}_{0.20}$ ps	5.3 ± 1.5	[0]	(6 ± 2)(-5)	
	2.50 → 1.27	$(3/2,5/2)^+ \rightarrow 3/2^-$	1.45 ± 0.45 ps	6 ± 2	[0]	(1.8 ± 0.8)(-5)	
^{39}K	3.02 → 0	$3/2^- \rightarrow 3/2^+$	25 ± 5 fs	100	≈ 0	(1.2 ± 0.2)(-3)	
	4.08 → 0	$3/2^- \rightarrow 3/2^+$	45 ± 20 fs	62 ± 3	≈ 0	(1.7 ± 0.8)(-4)	
	→ 2.52	$\rightarrow 1/2^+$		27 ± 3	[0]	(1.3 ± 0.6)(-3)	
	4.10 → 3.02	$1/2^+ \rightarrow 3/2^-$	80 ± 15 fs	9 ± 2	[0]	(7 ± 2)(-4)	
	4.48 → 2.52	$(1/2,3/2)^- \rightarrow 1/2^+$	210 ± 90 fs	47 ± 5	[0]	(2.6 ± 1.2)(-4)	
	4.93 → 4.08	$3/2^+ \rightarrow 3/2^-$	93 ± 25 fs	58 ± 7	[0]	(9 ± 3)(-3)	
	6.11 → 2.52	$(1/2,3/2)^- \rightarrow 1/2^+$	110 ± 40 fs	78 ± 5	[0]	(1.3 ± 0.5)(-4)	
	6.48 → 5.72	$15/2^+ \rightarrow 13/2^-$	11.9 ± 0.5 ps	100	≈ 0	(1.6 ± 0.1)(-4)	
	7.74 → 0	$3/2^-;3/2 \rightarrow 3/2^+$	675 ± 200 meV	15	≈ 0	(2.8 ± 0.9)(-4)	
	→ 2.52	$\rightarrow 1/2^+$		23	≈ 0	(1.4 ± 0.5)(-3)	
	8.03 → 7.78	$19/2^- \rightarrow 17/2^+$	20.0 ± 1.5 ps	11 ± 1	[0]	(3.0 ± 0.4)(-4)	
^{39}Ca	3.03 → 0	$3/2^- \rightarrow 3/2^+$	240 ± 80 fs	100	≈ 0	(1.2 ± 0.4)(-4)	
^{40}K	1.96 → 0.03	$2^+ \rightarrow 3^-$	850 ± 150 fs	19 ± 2	≈ 0	(2.6 ± 0.5)(-5)	
	→ 0.80	$\rightarrow 2^-$		81 ± 2	≈ 0	(5.2 ± 0.9)(-4)	
	2.26 → 0	$3^+ \rightarrow 4^-$	85 ± 15 fs	16 ± 2	≈ 0	(1.3 ± 0.3)(-4)	
	→ 0.03	$\rightarrow 3^-$	fs	84 ± 2	≈ 0	(7.4 ± 1.3)(-4)	
	2.290 → 0.80	$1^+ \rightarrow 2^-$	120 ± 20 fs	33 ± 3	≈ 0	(6.9 ± 1.5)(-4)	
	2.58 → 0.03	$(2,4)^+ \rightarrow 3^-$	190 ± 25 fs	100	[0]	(2.6 ± 0.3)(-4)	
	2.75 → 1.96	$(2,3)^- \rightarrow 2^+$	190 ± 50 fs	4 ± 1	[0]	(3.5 ± 1.3)(-4)	
	2.88 → 0.89	$6^+ \rightarrow 5^-$	390 ± 140 fs	36 ± 3	≈ 0	(1.0 ± 0.3)(-4)	
^{41}K	2.17 → 0	$3/2^- \rightarrow 3/2^+$	2.5 ± 0.8 ps	30 ± 8	[0]	(1.0 ± 0.4)(-5)	
	→ 0.98	$\rightarrow 1/2^+$		43 ± 8	≈ 0	(8 ± 3)(-5)	
^{41}Ca	2.61 → 0	$5/2^+ \rightarrow 7/2^-$	450 ± 100 fs	100	≈ 0	(1.0 ± 0.2)(-4)	
	2.67 → 1.94	$1/2^+ \rightarrow 3/2^-$	3.0 ± 0.7 ps	69 ± 2	[0]	(5.2 ± 1.2)(-4)	
	3.05 → 2.01	$3/2^- \rightarrow 3/2^+$	1.0 ± 0.3 ps	39 ± 2	[0]	(2.8 ± 0.9)(-4)	
	→ 2.61	$\rightarrow 5/2^+$		34 ± 3	[0]	(3.2 ± 1.0)(-3)	

TABLE III. Strengths of Isospin-Allowed $E1$ Transitions ($E1_{IV}$)
See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and remarks
^{41}Ca	3.05 → 2.67	$3/2^- \rightarrow 1/2^+$	1.0 ± 0.3 ps	4 ± 1	[0]	(6 ± 2)(-4)	
	3.20 → 0	$9/2^+ \rightarrow 7/2^-$	50 ± 15 fs	100	≈ 0	(5.0 ± 1.5)(-4)	
	3.49 → 3.05	$5/2^+ \rightarrow 3/2^-$	440 ± 100 fs	12 ± 3	[0]	(2.6 ± 0.9)(-3)	
	3.614 → 2.67	$1/2^- \rightarrow 1/2^+$	240 ± 60 fs	16 ± 2	0	(6.6 ± 1.7)(-4)	
	3.85 → 1.94	$1/2^+ \rightarrow 3/2^-$	160 ± 45 fs	20 ± 5	[0]	(1.5 ± 0.6)(-4)	
	4.45 → 0	$(5/2\text{-}9/2)^+ \rightarrow 7/2^-$	120 ± 45 fs	100	[0]	(8 ± 3)(-5)	
^{41}Sc	2.88 → 0	$7/2^+ \rightarrow 7/2^-$	58 ± 7 meV	100	≈ 0	(3.0 ± 0.4)(-3)	
	3.78 → 0	$5/2^+ \rightarrow 7/2^-$	26 ± 8 meV	100	[0]	(5.8 ± 1.9)(-4)	
	4.25 → 0	$5/2^+ \rightarrow 7/2^-$	53 ± 6 meV	100	[0]	(8 ± 3)(-4)	
	4.87 → 0	$5/2^+ \rightarrow 7/2^-$	7 ± 2 meV	100	[0]	(8 ± 3)(-5)	
	5.04 → 0	$9/2^+ \rightarrow 7/2^-$	240 ± 70 meV	72 ± 2	≈ 0	(1.7 ± 0.6)(-3)	
	5.38 → 0	$5/2^+ \rightarrow 7/2^-$	70 ± 20 meV	100	[0]	(5.6 ± 1.9)(-4)	
^{42}K	1.376 → 0.70	$6^+ \rightarrow 5^-$	1.6 ± 0.2 ns	89.7 ± 0.7	≈ 0	(1.4 ± 0.2)(-6)	
^{42}Ca	3.45 → 1.52	$3^- \rightarrow 2^+$	360 ± 140 fs	60 ± 2	≈ 0	(1.9 ± 0.8)(-4)	
	→ 2.42	$\rightarrow 2^+$		36 ± 2	≈ 0	(8 ± 3)(-4)	
	3.95 → 2.75	$4^- \rightarrow 4^+$	4.7 ± 0.3 ps	22 ± 6	≈ 0	(2.2 ± 0.6)(-5)	
	4.05 → 1.52	$3^- \rightarrow 2^+$	255 ± 55 fs	56 ± 6	[0]	(1.1 ± 0.2)(-4)	
	→ 2.42	$\rightarrow 2^+$		17 ± 6	[0]	(1.3 ± 0.5)(-4)	
	→ 2.75	$\rightarrow 4^+$		15 ± 5	[0]	(2.2 ± 0.8)(-4)	
	4.10 → 2.75	$5^- \rightarrow 4^+$	620 ± 100 fs	33 ± 2	≈ 0	(1.7 ± 0.3)(-4)	
	→ 3.19	$\rightarrow 6^+$		67 ± 2	[0]	(1.1 ± 0.2)(-3)	
	4.353 → 2.75	$4^- \rightarrow 4^+$	690 ± 80 fs	91 ± 3	≈ 0	(2.6 ± 0.3)(-4)	
	5.49 → 3.19	$6^- \rightarrow 6^+$	85 ± 20 fs	100	[0]	(7.7 ± 1.9)(-4)	
	5.74 → 3.19	$7^- \rightarrow 6^+$	600 ± 140 fs	46 ± 3	≈ 0	(3.7 ± 0.9)(-5)	
^{43}Ca	0.99 → 0.37	$3/2^+ \rightarrow 5/2^-$	71 ± 5 ps	88 ± 1	≈ 0	(4.1 ± 0.3)(-5)	
	→ 0.59	$\rightarrow 3/2^-$		12 ± 1	[0]	(2.1 ± 0.2)(-5)	
	1.39 → 0	$5/2^+ \rightarrow 7/2^-$	3.5 ± 1.1 ps	5.0 ± 0.2	[0]	(4.3 ± 1.4)(-6)	
	→ 0.37	$\rightarrow 5/2^-$		77.6 ± 0.5	[0]	(1.7 ± 0.5)(-4)	
	→ 0.59	$\rightarrow 3/2^-$		5.7 ± 0.2	[0]	(2.5 ± 0.8)(-5)	
	1.90 → 0	$7/2^+ \rightarrow 7/2^-$	800 ± 150 fs	70 ± 4	[0]	(1.0 ± 0.2)(-4)	
	2.41 → 0	$9/2^+ \rightarrow 7/2^-$	1.8 ± 0.7 ps	45 ± 4	[0]	(1.4 ± 0.6)(-5)	
	3.50 → 1.68	$13/2^+ \rightarrow 11/2^-$	105 ± 35 fs	75 ± 2	[0]	(9 ± 3)(-4)	
	→ 2.754	$\rightarrow 15/2^-$		13 ± 2	[0]	(2.3 ± 0.8)(-3)	
^{43}Sc	0.47 → 0.15	$3/2^- \rightarrow 3/2^+$	226 ± 15 ps	4 ± 1	[0]	(4.4 ± 1.1)(-6)	
	0.86 → 0.47	$1/2^+ \rightarrow 3/2^-$	32 ± 4 ps	20 ± 2	[0]	(8.2 ± 1.3)(-5)	
	1.65 → 0	$5/2^+ \rightarrow 7/2^-$	250 ± 40 fs	14 ± 2	[0]	(1.0 ± 0.2)(-4)	
	1.81 → 0.15	$3/2^- \rightarrow 3/2^+$	22 ± 7 fs	10 ± 3	[0]	(8 ± 3)(-4)	
	→ 0.86	$\rightarrow 1/2^+$		16 ± 4	[0]	(7 ± 3)(-3)	
	1.96 → 1.16	$5/2^- \rightarrow 3/2^+$	100 ± 20 fs	3 ± 1	[0]	(4.6 ± 1.8)(-4)	
	2.09 → 0.15	$3/2^- \rightarrow 3/2^+$	440 ± 100 fs	17 ± 3	[0]	(4.2 ± 1.2)(-5)	
	→ 0.86	$\rightarrow 1/2^+$		18 ± 2	[0]	(1.7 ± 0.4)(-4)	
	→ 0.88	$\rightarrow 5/2^+$		10 ± 2	[0]	(1.0 ± 0.3)(-4)	
^{44}Sc	0.07 → 0	$1^- \rightarrow 2^+$	221 ± 2 ns	100	≈ 0	(1.0 ± 0.1)(-5)	α = 0.09
	0.23 → 0	$2^- \rightarrow 2^+$	8.8 ± 0.3 ns	69 ± 2	≈ 0	(4.7 ± 0.2)(-6)	
	0.42 → 0	$3^- \rightarrow 2^+$	550 ± 60 ps	16 ± 2	≈ 0	(3.0 ± 0.5)(-6)	
	0.63 → 0.35	$4^- \rightarrow 4^+$	580 ± 35 ps	48 ± 2	≈ 0	(2.8 ± 0.2)(-5)	
	0.76 → 0.23	$3^+ \rightarrow 2^-$	310 ± 50 fs	7 ± 2	[0]	(1.3 ± 0.4)(-3)	

TABLE IV. Strengths of Isospin-Forbidden $E1$ Transitions ($E1_{IS}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and remarks
^{10}B	5.11 → 0	$2^- \rightarrow 3^+$	55 ± 11 meV	64 ± 7	[0]	(8 ± 2)(-4)	
	→ 0.72	$\rightarrow 1^+$		31 ± 7	[0]	(6.3 ± 1.9)(-4)	
^{13}C, ^{13}N	[	$1/2_1^+ \rightarrow 1/2_1^-$			0	(3.9 ± 1.8)(-3)]	See text
^{14}N	4.92 → 0	$0^- \rightarrow 1^+$	7.6 ± 1.4 fs	100	0	(1.8 ± 0.4)(-3)	
	5.11 → 0	$2^- \rightarrow 1^+$	12.4 ± 1.4 ps	74	≈0	(7.4 ± 0.8)(-7)	43
	→ 3.95	$\rightarrow 1^+$		1.4	[0]	(1.2 ± 0.4)(-6)	43
	5.69 → 0	$1^- \rightarrow 1^+$	10 ± 2 fs	30	[0]	(2.7 ± 0.6)(-4)	43
	→ 3.95	$\rightarrow 1^+$		1.0	[0]	(3.1 ± 1.0)(-4)	43
	6.20 → 4.92	$1^+ \rightarrow 0^-$	124 ± 15 fs	0.7	0	(4.5 ± 1.5)(-5)	43
	→ 5.11	$\rightarrow 2^-$		0.3	[0]	(3.1 ± 1.0)(-5)	43
	6.44 → 5.11	$3^+ \rightarrow 2^-$	625 ± 35 fs	6.4 ± 0.6	[0]	(6.8 ± 0.8)(-5)	55
	→ 5.83	$\rightarrow 3^-$		3.7 ± 0.6	[0]	(4.4 ± 0.8)(-4)	55
	7.97 → 0	$2^- \rightarrow 1^+$	18 ± 1 meV	55 ± 3	[0]	(4.8 ± 0.4)(-5)	
	→ 3.95	$\rightarrow 1^+$		45 ± 3	[0]	(7.2 ± 0.6)(-4)	
	8.06 → 2.31	$1^-;1 \rightarrow 0^+;1$	12.3 eV	1.3	0	(2.1 ± 0.7)(-3)	43
^{16}O	7.12 → 0	$1^- \rightarrow 0^+$	11.7 ± 1.1 fs	≈100	0	(3.4 ± 0.3)(-4)	51
	8.87 → 6.92	$2^- \rightarrow 2^+$	180 ± 16 fs	4.2 ± 0.8	[0]	(5.0 ± 1.0)(-5)	
	9.63 → 0	$1^- \rightarrow 0^+$	23 ± 3 meV	≈100	0	(6.0 ± 0.8)(-4)	
	11.10 → 6.13	$4^+ \rightarrow 3^-$	5.6 ± 1.4 meV	55 ± 12	[0]	(6 ± 2)(-5)	
	[12.44 → 0	$1^- \rightarrow 0^+$	9.6 ± 1.7 eV	98.8 ± 0.4	0	(1.1 ± 0.2)(-2)]	Upper state
	[→ 6.05	$\rightarrow 0^+$		1.2 ± 0.4	0	(1.0 ± 0.4)(-3)]	T-mixed
^{18}F	1.08 → 0	$0^- \rightarrow 1^+$	27.5 ± 1.9 ps	100	0	(4.1 ± 0.3)(-5)	
	2.10 → 0	$2^- \rightarrow 1^+$	4.3 ± 1.4 ps	38 ± 1	[0]	(1.3 ± 0.4)(-5)	
	→ 0.94	$\rightarrow 3^+$		31 ± 1	[0]	(7 ± 2)(-5)	
	3.13 → 0	$1^- \rightarrow 1^+$	310 ± 70 fs	39 ± 2	≈0	(5.9 ± 1.3)(-5)	
	→ 1.70	$\rightarrow 1^+$		2.0 ± 0.5	≈0	(3.1 ± 1.0)(-5)	
	4.23 → 0	$2^- \rightarrow 1^+$	110 ± 15 fs	23 ± 2	≈0	(3.9 ± 0.6)(-5)	
	→ 0.94	$\rightarrow 3^+$		49 ± 3	≈0	(1.8 ± 0.2)(-4)	
	→ 1.70	$\rightarrow 1^+$		9.3 ± 1.2	[0]	(7.2 ± 1.4)(-5)	
	4.40 → 0.94	$4^- \rightarrow 3^+$	58 ± 12 fs	13 ± 4	≈0	(8 ± 3)(-5)	
	→ 1.12	$\rightarrow 5^+$		60 ± 6	≈0	(4.3 ± 1.0)(-4)	
	6.10 → 0.94	$4^- \rightarrow 3^+$	51 ± 10 meV	4.9 ± 0.9	[0]	(3.9 ± 1.1)(-5)	
	→ 1.12	$\rightarrow 5^+$		55 ± 3	[0]	(4.9 ± 1.0)(-4)	
	→ 4.12	$\rightarrow 3^+$		1.8 ± 0.3	[0]	(2.5 ± 0.6)(-4)	
^{20}Ne	4.97 → 1.63	$2^- \rightarrow 2^+$	4.8 ± 0.5 ps	99.4 ± 0.2	≈0	(7.4 ± 0.8)(-6)	
	5.62 → 1.63	$3^- \rightarrow 2^+$	240 ± 65 μeV	87.6 ± 1.0	[0]	(6.6 ± 1.9)(-6)	
	5.78 → 0	$1^- \rightarrow 0^+$	4.3 ± 1.0 meV	18 ± 5	0	(8 ± 3)(-6)	
	→ 1.63	$\rightarrow 2^+$		82 ± 5	[0]	(1.0 ± 0.2)(-4)	
	7.00 → 4.25	$4^- \rightarrow 4^+$	440 ± 90 fs	63.5	[0]	(8.6 ± 1.8)(-5)	
^{21}Ne, ^{21}Na	[	$3/2_2^- \rightarrow 1/2_1^+$				(1.1 ± 0.4)(-2)]	See text
^{22}Na	2.57 → 0	$2^- \rightarrow 3^+$	8.1 ± 0.4 ps	76 ± 2	≈0	(6.9 ± 0.4)(-6)	
	→ 0.58	$\rightarrow 1^+$		21 ± 2	≈0	(4.0 ± 0.5)(-6)	
	3.52 → 0	$3^- \rightarrow 3^+$	670 ± 120 fs	14 ± 3	≈0	(7 ± 2)(-6)	
	→ 0.89	$\rightarrow 4^+$		7 ± 2	[0]	(7 ± 2)(-6)	
	4.47 → 0.89	$4^- \rightarrow 4^+$	150 ± 60 fs	11 ± 3	[0]	(2.0 ± 0.9)(-5)	
	→ 1.53	$\rightarrow 5^+$		14 ± 3	[0]	(5 ± 2)(-5)	
	→ 1.98	$\rightarrow 3^+$		9 ± 3	[0]	(5 ± 2)(-5)	
	7.60 → 0	$2^- \rightarrow 3^+$	260 ± 60 meV	32 ± 2	[0]	(3.6 ± 0.8)(-4)	
	→ 0.58	$\rightarrow 1^+$		10 ± 2	[0]	(1.4 ± 0.4)(-4)	
	→ 1.98	$\rightarrow 3^+$		23 ± 3	[0]	(6.3 ± 1.7)(-4)	
	→ 3.06	$\rightarrow 2^+$		11 ± 2	[0]	(5.8 ± 1.7)(-4)	
	→ 3.94	$\rightarrow 1^+$		8 ± 1	[0]	(8 ± 2)(-4)	
	→ 4.36	$\rightarrow 2^+$		6 ± 1	[0]	(9 ± 3)(-4)	
^{24}Mg	7.55 → 0	$1^- \rightarrow 0^+$	390 ± 80 fs	45 ± 10	0	(3.0 ± 0.9)(-6)	
	→ 1.37	$\rightarrow 2^+$		35 ± 10	[0]	(4.2 ± 1.5)(-6)	

TABLE IV. Strengths of Isospin-Forbidden $E1$ Transitions ($E1_{IS}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and remarks
^{24}Mg	7.62 → 1.37	$3^- \rightarrow 2^+$	1.7 ± 0.3 ps	72 ± 2	[0]	(2.1 ± 0.4)(-6)	
	→ 4.12	$\rightarrow 4^+$		5 ± 1	[0]	(8 ± 2)(-7)	
	8.36 → 1.37	$3^- \rightarrow 2^+$	115 ± 25 fs	49 ± 3	[0]	(1.5 ± 0.4)(-5)	
	→ 5.24	$\rightarrow 3^+$		16 ± 2	[0]	(5.4 ± 1.1)(-5)	
	→ 6.01	$\rightarrow 4^+$		11 ± 2	[0]	(9 ± 2)(-5)	
^{28}Si	6.88 → 4.62	$3^- \rightarrow 4^+$	2.6 ± 0.4 ps	3.0 ± 0.7	[0]	(1.1 ± 0.3)(-6)	
	8.41 → 4.62	$4^- \rightarrow 4^+$	430 ± 90 fs	4.0 ± 1.5	[0]	(1.8 ± 0.8)(-6)	
	8.90 → 0	$1^- \rightarrow 0^+$	11 ± 3 fs	47 ± 3	0	(6 ± 2)(-5)	
	→ 1.78	$\rightarrow 2^+$		53 ± 3	[0]	(1.4 ± 0.4)(-4)	
	9.70 → 6.89	$5^- \rightarrow 4^+$	6 ± 2 ps	7 ± 1	[0]	(5.5 ± 2.0)(-7)	
	10.18 → 1.78	$3^- \rightarrow 2^+$	10 ± 3 fs	25 ± 5	[0]	(4.5 ± 1.6)(-5)	
	→ 4.62	$\rightarrow 4^+$		75 ± 5	[0]	(4.5 ± 1.4)(-4)	
	12.20 → 1.78	$3^- \rightarrow 2^+$	530 meV	73	[0]	(5.6 ± 1.9)(-4)	
	→ 4.62	$\rightarrow 4^+$		15	[0]	(2.9 ± 1.0)(-4)	
	→ 6.28	$\rightarrow 3^+$		1.5	[0]	(6 ± 2)(-5)	
	→ 6.89	$\rightarrow 4^+$		1.4	[0]	(8 ± 3)(-5)	
	12.49 → 1.78	$3^- \rightarrow 2^+$	460 meV	48	[0]	(2.9 ± 1.0)(-4)	
	→ 4.62	$\rightarrow 4^+$		19	[0]	(2.9 ± 1.0)(-4)	
	→ 6.28	$\rightarrow 3^+$		7.0	[0]	(2.1 ± 0.7)(-4)	
	→ 7.38	$\rightarrow 2^+$		3.0	[0]	(1.7 ± 0.6)(-4)	
	12.73 → 6.88	$2^+ \rightarrow 3^-$	900 meV	2.4	[0]	(1.7 ± 0.6)(-4)	
	12.86 → 6.88	$4^+ \rightarrow 3^-$	430 meV	1.5	[0]	(4.9 ± 1.6)(-5)	
^{29}Si, ^{29}P		$3/2_1^- \rightarrow 1/2_1^+$				(1.2 ± 0.4)(-3)	
		$\rightarrow 3/2_1^+$				(7 ± 3)(-4)	
^{30}P	4.14 → 0	$2^- \rightarrow 1^+$	50 ± 10 fs	72 ± 5	≈ 0	(2.1 ± 0.4)(-4)	
	→ 0.71	$\rightarrow 1^+$		10 ± 3	[0]	(5.0 ± 1.8)(-5)	
	→ 1.45	$\rightarrow 2^+$		13 ± 3	[0]	(1.3 ± 0.4)(-4)	
	4.62 → 1.45	$3^- \rightarrow 2^+$	240 ± 40 fs	71 ± 3	≈ 0	(9.0 ± 1.5)(-5)	
	→ 1.97	$\rightarrow 3^+$		5 ± 2	[0]	(1.1 ± 0.5)(-5)	
	6.883 → 0	$2^- \rightarrow 1^+$	590 ± 180 meV	73	≈ 0	(2.0 ± 0.7)(-3)	
	→ 0.71	$\rightarrow 1^+$		2	[0]	(8 ± 3)(-4)	
	→ 1.45	$\rightarrow 2^+$		7	[0]	(3.9 ± 1.3)(-4)	
	→ 2.84	$\rightarrow 3^+$		3	[0]	(4.1 ± 1.4)(-4)	
	→ 3.02	$\rightarrow 1^+$		6	[0]	(9 ± 3)(-4)	
	6.93 → 0	$1^- \rightarrow 1^+$	1.6 ± 0.5 eV	7	[0]	(5.1 ± 1.7)(-4)	
	→ 1.45	$\rightarrow 2^+$		9	≈ 0	(1.3 ± 0.4)(-3)	
	→ 2.72	$\rightarrow 2^+$		2	[0]	(7 ± 2)(-4)	
^{32}S	5.01 → 2.23	$3^- \rightarrow 2^+$	550 ± 100 fs	96.9 ± 0.5	≈ 0	(7.9 ± 1.4)(-5)	
	5.80 → 0	$1^- \rightarrow 0^+$	10 ± 4 fs	100	0	(5 ± 2)(-4)	
	6.22 → 2.23	$2^- \rightarrow 2^+$	85 ± 15 fs	100	≈ 0	(1.8 ± 0.3)(-4)	
	6.62 → 4.46	$4^- \rightarrow 4^+$	650 ± 100 fs	22 ± 3	≈ 0	(3.2 ± 0.7)(-5)	
	→ 5.41	$\rightarrow 3^+$		1.4 ± 0.2	≈ 0	(1.2 ± 0.3)(-5)	
	9.49 → 0	$1^- \rightarrow 0^+$	370 meV	82	0	(5.1 ± 1.7)(-4)	
	→ 4.28	$\rightarrow 2^+$		9.5	[0]	(3.6 ± 1.2)(-4)	
	10.232 → 6.22	$1^+ \rightarrow 2^-$	310 meV	2	[0]	(1.4 ± 0.5)(-4)	
^{33}S, ^{33}Cl		$3/2_2^- \rightarrow 1/2_1^+$				(2.1 ± 0.9)(-3)	
^{34}Cl	3.55 → 0.15	$3^- \rightarrow 3^+$	140 ± 50 fs	96 ± 2	≈ 0	(1.6 ± 0.6)(-4)	
	3 60 → 0.15	$4^- \rightarrow 3^+$	23 ± 5 ps	47 ± 2	≈ 0	(4.6 ± 1.0)(-7)	37
	→ 2.38	$\rightarrow 4^+$		7 ± 1	[0]	(1.5 ± 0.4)(-6)	37
	3.63 → 2.38	$5^- \rightarrow 4^+$	280 ± 60 ps	39 ± 6	≈ 0	(6.5 ± 1.7)(-7)	36,37
	3.98 → 0.15	$3^- \rightarrow 3^+$	160 ± 60 fs	63 ± 2	≈ 0	(6 ± 2)(-5)	
	4.35 → 0.46	$1^- \rightarrow 1^+$	65 ± 20 fs	9 ± 2	[0]	(2.2 ± 0.8)(-5)	
	4.46 → 0.15	$(2,3)^- \rightarrow 3^+$	200 ± 60 fs	100	[0]	(5.8 ± 1.7)(-5)	
	6.37 → 2.72	$2^+ \rightarrow 2^-$	300 ± 120 meV	6	[0]	(5.1 ± 1.7)(-4)	
	→ 3.55	$\rightarrow 3^-$		2	[0]	(3.8 ± 1.3)(-4)	

TABLE IV. Strengths of Isospin-Forbidden $E1$ Transitions ($E1_{IS}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and remarks
^{34}Cl	6.37 → 4.35	$2^+ \rightarrow 1^-$	300 ± 120 meV	2.5	[0]	(1.3 ± 0.4)(-3)	
	→ 4.52	$\rightarrow 2^-$		1	[0]	(7 ± 2)(-4)	
^{36}Ar	4.18 → 1.97	$3^- \rightarrow 2^+$	3.3 ± 0.4 ps	93.5 ± 0.4	≈ 0	(2.6 ± 0.3)(-5)	
	4.97 → 1.97	$2^- \rightarrow 2^+$	14 ± 5 ps	4.0 ± 0.9	[0]	(9 ± 3)(-8)	
	5.17 → 4.41	$5^- \rightarrow 4^+$	127 ± 5 ps	11.8 ± 0.3	≈ 0	(1.9 ± 0.1)(-6)	
	5.84 → 0	$1^- \rightarrow 0^+$	9 ± 3 fs	91 ± 2	0	(4.4 ± 1.5)(-4)	
	→ 1.97	$\rightarrow 2^+$		7 ± 2	[0]	(1.2 ± 0.5)(-4)	
	5.86 → 1.97	$3^- \rightarrow 2^+$	450 ± 150 fs	83 ± 2	≈ 0	(2.8 ± 0.8)(-5)	
	6.22 → 4.41	$5^- \rightarrow 4^+$	290 ± 50 fs	9.4 ± 1.3	≈ 0	(4.8 ± 0.8)(-5)	
	6.837 → 4.95	$3^- \rightarrow 2^+$	240 ± 60 fs	3.5 ± 0.5	[0]	(2.0 ± 0.6)(-5)	
	9.36 → 4.18	$2^+ \rightarrow 3^-$	80 meV	6	[0]	(4.7 ± 1.6)(-5)	
	→ 4.97	$\rightarrow 2^-$		5	[0]	(6 ± 2)(-5)	
	9.466 → 4.18	$2^+ \rightarrow 3^-$	170 meV	3	[0]	(3.1 ± 1.0)(-5)	
^{38}K	2.87 → 0	$2^- \rightarrow 3^+$	4.5 ± 1.2 ps	42 ± 4	[0]	(3.0 ± 0.9)(-6)	
	→ 0.46	$\rightarrow 1^+$		31 ± 5	[0]	(4.2 ± 1.3)(-6)	
	→ 1.70	$\rightarrow 1^+$		11 ± 4	[0]	(1.3 ± 0.6)(-5)	
	2.99 → 0.46	$0^- \rightarrow 1^+$	220 ± 50 fs	100	0	(2.4 ± 0.5)(-4)	
	3.46 → 3.42	$(5,7)^+ \rightarrow (4\text{-}6)^-$	32.6 ± 0.6 μs	81.3 ± 0.4	[0]	(3.4 ± 0.1)(-7)	α = 0.40
^{39}K, ^{39}Ca		$3/2_1^- \rightarrow 3/2_1^+$				(1.4 ± 0.5)(-4)	
^{40}Ca	5.90 → 0	$1^- \rightarrow 0^+$	60 ± 20 fs	100	0	(7 ± 2)(-5)	
	6.026 → 3.90	$2^- \rightarrow 2^+$	220 ± 40 fs	23 ± 3	≈0	(9 ± 2)(-5)	
	6.29 → 3.90	$3^- \rightarrow 2^+$	490 ± 70 fs	21 ± 5	[0]	(2.6 ± 0.7)(-5)	
	6.58 → 3.90	$3^- \rightarrow 2^+$	250 ± 45 fs	23 ± 5	[0]	(4.0 ± 1.1)(-5)	
	6.95 → 0	$1^- \rightarrow 0^+$	1.3 ± 0.1 fs	100	0	(1.9 ± 0.2)(-3)	
	7.45 → 5.61	$(3,4)^+ \rightarrow 4^-$	200 ± 70 fs	30	[0]	(2.0 ± 0.7)(-4)	
	7.56 → 3.74	$(3,4)^+ \rightarrow 3^-$	200 ± 60 fs	60	[0]	(4.5 ± 1.5)(-5)	
^{44}Ti	3.76 → 0	$1^- \rightarrow 0^+$	240 ± 50 fs	72 ± 5	0	(4.4 ± 0.9)(-5)	
	→ 1.08	$\rightarrow 2^+$		28 ± 5	[0]	(4.7 ± 1.3)(-5)	

TABLE V. Strengths of Isospin-Allowed $E2$ Transitions ($E2_{IS}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{6}Li	2.19 → 0	$3^+ \rightarrow 1^+$		from B(E2)		(1.5 ± 0.1)(+1)	
^{7}Li	0.48 → 0	$1/2^- \rightarrow 3/2^-$		from B(E2)		(1.9 ± 0.1)(+1)	
	7.46 → 0	$5/2^- \rightarrow 3/2^-$		from B(E2)		(4.5 ± 1.5)(+1)	
^{9}Be	2.43 → 0	$5/2^- \rightarrow 3/2^-$		from B(E2)		(2.4 ± 0.2)(+1)	
	6.76 → 0	$7/2^- \rightarrow 3/2^-$		from B(E2)		(8.7 ± 0.4)(0)	
^{10}Be	3.37 → 0	$2^+ \rightarrow 0^+$	180 ± 17 fs	100	0	(8.0 ± 0.8)(0)	
	6.18 → 3.37	$0^+ \rightarrow 2^+$	1.1 ± 0.4 ps	76 ± 2	0	(2.3 ± 0.9)(0)	
^{10}B	0.72 → 0	$1^+ \rightarrow 3^+$	1.013 ± 0.015 ns	100	[0]	(3.3 ± 0.1)(0)	
	2.15 → 0	$1^+ \rightarrow 3^+$	2.13 ± 0.18 ps	21.1 ± 1.6	[0]	(1.4 ± 0.2)(0)	
	3.59 → 0	$2^+ \rightarrow 3^+$	147 ± 14 fs	19 ± 3	+1.5 ± 0.6	(9 ± 3)(-1)	
	→ 0.72	$\rightarrow 1^+$		67 ± 3	+1/(0.11 ± 0.10)	(1.4 ± 0.2)(+1)	
	→ 2.15	$\rightarrow 1^+$		14 ± 2	-0.38 ± 0.09	(1.2 ± 0.5)(+1)	
	4.77 → 0.72	$3^+ \rightarrow 1^+$	33 ± 6 meV	99.5 ± 0.1	≈ 0	(2.7 ± 0.5)(+1)	
	6.03 → 0	$4^+ \rightarrow 3^+$		from B(E2)		(1.5 ± 0.2)(+1)	
^{10}C	3.35 → 0	$2^+ \rightarrow 0^+$	155 ± 25 fs	100	0	(9.6 ± 1.5)(0)	
^{11}B	4.45 → 0	$5/2^- \rightarrow 3/2^-$	1.08 ± 0.05 fs	100	-0.19 ± 0.03	(1.0 ± 0.3)(+1)	
	8.56 → 0	$(1/2\text{-}5/2)^- \rightarrow 3/2^-$		from B(E2)		(4.5 ± 0.6)(0)	
^{12}C	4.44 → 0	$2^+ \rightarrow 0^+$	61 ± 3 fs	100	0	(4.5 ± 0.2)(0)	
	7.66 → 4.44	$0^+ \rightarrow 2^+$	3.5 ± 0.8 meV	≈ 100	0	(7.6 ± 1.7)(0)	
^{13}C	3.68 → 0	$3/2^- \rightarrow 1/2^-$		from B(E2)		(4.1 ± 0.9)(0)	
	3.85 → 3.09	$5/2^+ \rightarrow 1/2^+$	12.7 ± 0.3 ps	0.8 ± 0.2	[0]	(1.1 ± 0.3)(0)	47
	7.55 → 0	$5/2^- \rightarrow 1/2^-$		from B(E2)		(3.1 ± 0.2)(0)	
	9.90 → 0	$3/2^- \rightarrow 1/2^-$		from B(E2)		(4.3 ± 0.8)(-2)	
^{13}N	3.51 → 0	$3/2^- \rightarrow 1/2^-$	660 meV	92 ± 1	0.09 ± 0.02	(6 ± 2)(0)	
^{14}C	6.73 → 6.09	$3^- \rightarrow 1^-$	97 ± 15 ps	4 ± 1	[0]	(1.5 ± 0.4)(0)	
	7.01 → 0	$2^+ \rightarrow 0^+$	13 ± 2 fs	98.6 ± 0.7	0	(1.8 ± 0.3)(0)	
	8.32 → 0	$2^+ \rightarrow 0^+$		from B(E2)	0	(7 ± 3)(-2)	
^{14}N	3.95 → 0	$1^+ \rightarrow 1^+$		from B(E2)		(1.7 ± 0.2)(0)	
	6.44 → 0	$3^+ \rightarrow 1^+$	625 ± 35 fs	69.6 ± 1.5	≈ 0	(3.9 ± 0.2)(-2)	55
	→ 3.95	$\rightarrow 1^+$		19.6 ± 1.0	[0]	(1.3 ± 0.1)(0)	55
	7.03 → 0	$2^+ \rightarrow 1^+$	5.4 ± 0.5 fs	98.8	+0.74 ± 0.09	(1.5 ± 0.3)(0)	43
	8.49 → 5.11	$4^- \rightarrow 2^-$	7.4 ± 2.1 meV	100	≈ 0	(1.0 ± 0.3)(+1)	50
	8.96 → 6.44	$5^+ \rightarrow 3^+$	1.4 ± 0.2 meV	100	[0]	(8.5 ± 1.2)(0)	
	9.17 → 2.31	$2^+;1 \rightarrow 0^+;1$	11.9 eV	0.85 ± 0.08	0	(4.0 ± 1.3)(0)	55
	10.81 → 6.44	$5^+ \rightarrow 3^+$	16 ± 7 meV	100	[0]	(6 ± 2)(0)	
^{15}C	0.74 → 0	$5/2^+ \rightarrow 1/2^+$	3.76 ± 0.10 ns	100	[0]	(4.2 ± 0.1)(-1)	
^{15}N	6.32 → 0	$3/2^- \rightarrow 1/2^-$	250 ± 20 as	100	-0.137 ± 0.005	(2.7 ± 0.3)(0)	
	9.76 → 0	$5/2^- \rightarrow 1/2^-$		from B(E2)		(1.2 ± 0.3)(0)	35
	10.70 → 0	$3/2^- \rightarrow 1/2^-$	370 ± 70 meV	52.6 ± 0.8	+0.180 ± 0.004	(2.4 ± 0.5)(-2)	
	→ 6.32	$\rightarrow 3/2^-$		3.8 ± 0.1	+0.135 ± 0.015	(9 ± 3)(-2)	
	→ 9.23	$\rightarrow 1/2^-$		1.5 ± 0.1	+0.049 ± 0.006	(1.1 ± 0.3)(0)	
^{15}O	9.49 → 0	$5/2^- \rightarrow 1/2^-$	2.4 eV	86	[0]	(1.5 ± 0.5)(+1)	
^{16}N	0.12 → 0	$0^- \rightarrow 2^-$	7.58 ± 0.09 μs	100	0	(1.7 ± 0.1)(0)	
^{16}O	6.92 → 0	$2^+ \rightarrow 0^+$	6.0 ± 0.6 fs	≈ 100	0	(3.5 ± 0.4)(0)	
	→ 6.05	$\rightarrow 0^+$		$(2.7 \pm 0.3)\times10^{-2}$	0	(3.1 ± 0.4)(+1)	
	7.12 → 6.13	$1^- \rightarrow 3^-$	11.7 ± 1.1 fs	0.08 ± 0.02	[0]	(2.3 ± 0.6)(+1)	51
	8.87 → 6.13	$2^- \rightarrow 3^-$	180 ± 16 fs	76 ± 2	+1.4 ± 0.4	(6.3 ± 1.3)(0)	
	9.85 → 0	$2^+ \rightarrow 0^+$	10.2 ± 0.8 meV	61 ± 4	0	(3.4 ± 0.3)(-2)	
	→ 6.05	$\rightarrow 0^+$		18 ± 4	0	(1.1 ± 0.2)(0)	
	10.35 → 6.92	$4^+ \rightarrow 2^+$	58 ± 7 meV	≈ 100	[0]	(6.2 ± 0.8)(+1)	
	11.10 → 6.92	$4^+ \rightarrow 2^+$	5.6 ± 1.4 meV	45 ± 12	[0]	(1.0 ± 0.3)(0)	
	11.52 → 0	$2^+ \rightarrow 0^+$	665 ± 20 meV	91.7 ± 1.2	0	(1.5 ± 0.1)(0)	
	→ 6.05	$\rightarrow 0^+$		4.2 ± 0.7	0	(2.9 ± 0.5)(0)	
^{17}N	1.91 → 0	$5/2^- \rightarrow 1/2^-$	11 ± 2 ps	74 ± 4	≈ 0	(8 ± 2)(-1)	
	2.53 → 1.85	$5/2^+ \rightarrow 1/2^+$	33 ± 3 ps	12 ± 2	≈ 0	(7.7 ± 1.5)(0)	

TABLE V. Strengths of Isospin-Allowed $E2$ Transitions ($E2_{IS}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \to E_{xf}$ (MeV)	$J_i^\pi;T_i \to J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{17}O	0.87 → 0	$1/2^+ \to 5/2^+$	259 ± 3 ps	100	≈ 0	(2.4 ± 0.1)(0)	
^{17}F	0.50 → 0	$1/2^+ \to 5/2^+$	412 ± 9 ps	100	[0]	(2.5 ± 0.1)(+1)	
^{18}O	1.98 → 0	$2^+ \to 0^+$	2.92 ± 0.13 ps	100	0	(3.3 ± 0.1)(0)	
	3.56 → 1.98	$4^+ \to 2^+$	24.8 ± 1.2 ps	100	[0]	(1.2 ± 0.1)(0)	
	3.63 → 1.98	$0^+ \to 2^+$	1.38 ± 0.16 ps	≈ 100	0	(1.7 ± 0.2)(+1)	
	3.92 → 0	$2^+ \to 0^+$	24 ± 10 fs	15 ± 2	0	(2.0 ± 0.8)(0)	
	5.26 → 0	$2^+ \to 0^+$	120 ± 30 fs	32 ± 2	0	(1.9 ± 0.5)(-1)	
	5.34 → 1.98	$0^+ \to 2^+$	200 ± 40 fs	60 ± 2	0	(2.0 ± 0.4)(0)	
	7.12 → 1.98	$4^+ \to 2^+$	80 meV	27.5 ± 1.5	≈ 0	(2.7 ± 0.9)(0)	
^{18}F	0.94 → 0	$3^+ \to 1^+$	68 ± 3 ps	100	[0]	(5.7 ± 0.4)(0)	
	1.12 → 0.94	$5^+ \to 3^+$	218 ± 8 ns	100	[0]	(6.1 ± 0.2)(0)	
	2.10 → 1.08	$2^- \to 0^-$	4.3 ± 1.4 ps	31 ± 1	0	(1.8 ± 0.6)(+1)	
	2.52 → 0	$2^+ \to 1^+$	680 ± 110 fs	74.9 ± 1.8	+3.5 ± 0.6	(2.7 ± 0.4)(0)	
	→ 0.94	$\to 3^+$		21.5 ± 1.2	-1.5 ± 0.6	(6 ± 2)(0)	
	3.36 → 0	$3^+ \to 1^+$	490 ± 70 fs	45 ± 5	[0]	(6.0 ± 1.0)(-1)	
	→ 1.70	$\to 1^+$		40 ± 4	[0]	(1.9 ± 0.3)(+1)	
	3.84 → 0	$2^+ \to 1^+$	29 ± 9 fs	38 ± 2	-1.8 ± 0.5	(3.4 ± 1.1)(0)	
	4.23 → 1.08	$2^- \to 0^-$	110 ± 15 fs	3.2 ± 1.0	0	(2.6 ± 0.9)(-1)	
	4.40 → 2.10	$4^- \to 2^-$	58 ± 12 fs	27 ± 3	[0]	(2.1 ± 0.5)(+1)	
	5.30 → 2.52	$4^+ \to 2^+$	11 ± 4 meV	78 ± 3	[0]	(2.2 ± 0.8)(+1)	
	→ 3.36	$\to 3^+$		5 ± 1	+2.5 ± 0.8	(8 ± 3)(0)	
	6.10 → 2.10	$4^- \to 2^-$	51 ± 10 meV	27 ± 2	[0]	(5.8 ± 1.2)(0)	
^{18}Ne	1.89 → 0	$2^+ \to 0^+$	670 ± 60 fs	100	0	(1.8 ± 0.2)(+1)	
	3.38 → 1.89	$4^+ \to 2^+$	4.4 ± 0.6 ps	100	[0]	(8.8 ± 1.2)(0)	
	3.62 → 0	$2^+ \to 0^+$	63 ± 25 fs	9 ± 2	0	(7 ± 3)(-1)	
^{19}O	1.47 → 0	$1/2^+ \to 5/2^+$	1.27 ± 0.17 ps	1.7 ± 0.3	[0]	(5.2 ± 1.2)(-1)	
^{19}F	0.20 → 0	$5/2^+ \to 1/2^+$	128.8 ± 1.5 ns	100	[0]	(7.0 ± 0.1)(0)	
	1.35 → 0.11	$5/2^- \to 1/2^-$	4.8 ± 0.5 ps	96.4 ± 0.7	≈ 0	(1.8 ± 0.2)(+1)	
	1.46 → 0.11	$3/2^- \to 1/2^-$	75 ± 13 fs	68.8 ± 0.7	+0.36 ± 0.07	(6 ± 2)(+1)	
	1.55 → 0	$3/2^+ \to 1/2^+$		from B(E2)		(6.9 ± 0.5)(0)	
	2.78 → 0.20	$9/2^+ \to 5/2^+$	260 ± 30 fs	≈ 100	[0]	(8.6 ± 0.9)(0)	
	4.03 → 1.35	$9/2^- \to 5/2^-$	73 ± 11 fs	≈ 100	[0]	(2.6 ± 0.4)(+1)	
	4.55 → 0	$5/2^+ \to 1/2^+$		from B(E2)		(1.0 ± 0.2)(0)	
	4.65 → 2.78	$13/2^+ \to 9/2^+$	2.2 ± 0.3 ps	100	[0]	(5.3 ± 0.7)(0)	
	6.28 → 0	$5/2^+ \to 1/2^+$	330 ± 70 meV	14 ± 2	≈ 0	(1.9 ± 0.5)(0)	
	6.33 → 1.55	$7/2^+ \to 3/2^+$	190 ± 40 meV	8.5 ± 1.5	≈ 0	(2.6 ± 0.7)(0)	
	6.79 → 0.11	$3/2^- \to 1/2^-$	5.5 ± 0.8 eV	39 ± 2	+0.11 ± 0.02	(8 ± 3)(-1)	
	8.29 → 4.03	$13/2^- \to 9/2^-$	76 ± 11 meV	91 ± 1	[0]	(2.0 ± 0.3)(+1)	
	8.96 → 4.00	$11/2^- \to 7/2^-$	230 ± 30 meV	26 ± 3	≈ 0	(8.0 ± 1.4)(0)	
	→ 5.43	$\to 7/2^-$		3 ± 1	[0]	(4.9 ± 1.7)(0)	
^{19}Ne	0.24 → 0	$5/2^+ \to 1/2^+$	26.0 ± 0.8 ns	100	[0]	(1.4 ± 0.1)(+1)	
	1.51 → 0.28	$5/2^- \to 1/2^-$	1.6 ± 0.6 ps	88 ± 3	[0]	(5.4 ± 2.0)(+1)	
	2.79 → 0.24	$9/2^+ \to 5/2^+$	140 ± 35 fs	100	[0]	(1.7 ± 0.4)(+1)	
^{20}O	1.67 → 0	$2^+ \to 0^+$	9.8 ± 0.7 ps	100	0	(1.9 ± 0.1 (0)	
^{20}F	0.82 → 0	$4^+ \to 2^+$	79 ± 6 ps	41 ± 4	[0]	(3.5 ± 0.5)(0)	
^{20}Ne	1.63 → 0	$2^+ \to 0^+$	1.20 ± 0.15 ps	100	0	(1.8 ± 0.2)(+1)	
	4.25 → 1.63	$4^+ \to 2^+$	93 ± 9 fs	≈ 100	[0]	(2.1 ± 0.2)(+1)	
	6.72 → 1.63	$0^+ \to 2^+$	33 meV	≈ 100	0	(3.6 ± 1.2)(0)	
	7.00 → 4.97	$4^- \to 2^-$	440 ± 90 fs	11	[0]	(1.8 ± 0.4)(0)	
	7.19 → 1.63	$0^+ \to 2^+$	4.4 ± 0.8 meV	≈ 100	0	(3.1 ± 0.6)(-1)	
	7.42 → 1.63	$2^+ \to 2^+$	29 ± 4 meV	>90	-8.4 ± 1.3	(1.7 ± 0.3)(0)	
	7.83 → 0	$2^+ \to 0^+$	69 ± 7 meV	83 ± 1	0	(7.3 ± 0.7)(-1)	
	8.45 → 5.62	$5^- \to 3^-$	13 ± 3 meV	100	[0]	(2.6 ± 0.6)(+1)	
	8.78 → 4.25	$6^+ \to 4^+$	100 ± 15 meV	100	[0]	(2.0 ± 0.3)(+1)	
	9.03 → 1.63	$4^+ \to 2^+$	340 ± 40 meV	100	[0]	(5.8 ± 0.7)(0)	

TABLE V. Strengths of Isospin-Allowed $E2$ Transitions ($E2_{IS}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{20}Ne	9.99 → 1.63	$4^+ \rightarrow 2^+$	900 ± 400 meV	>90	[0]	(8 ± 3)(0)	
	10.61 → 7.00	$6^- \rightarrow 4^-$	29 ± 9 meV	95.5 ± 1.2	[0]	(1.7 ± 0.5)(+1)	
^{21}F	0.28 → 0	$1/2^+ \rightarrow 5/2^+$	8.8 ± 0.8 ns	100	[0]	(1.5 ± 0.2)(+1)	
^{21}Ne	0.35 → 0	$5/2^+ \rightarrow 3/2^+$		from B(E2)		(2.3 ± 0.5)(+1)	
	1.75 → 0	$7/2^+ \rightarrow 3/2^+$	79 ± 5 fs	5 ± 1	≈ 0	(9 ± 2)(0)	59
	→ 0.35	$\rightarrow 5/2^+$		95 ± 1	+0.14 ± 0.02	(1.0 ± 0.3)(+1)	59
	2.87 → 0.35	$9/2^+ \rightarrow 5/2^+$	63 ± 5 fs	38 ± 2	≈ 0	(1.4 ± 0.1)(+1)	59
	4.43 → 1.75	$11/2^+ \rightarrow 7/2^+$	36 ± 6 fs	33 ± 12	[0]	(1.5 ± 0.6)(+1)	
^{22}Ne	1.27 → 0	$2^+ \rightarrow 0^+$	5.3 ± 0.2 ps	100	0	(1.3 ± 0.1)(+1)	
	3.36 → 1.27	$4^+ \rightarrow 2^+$	324 ± 6 fs	100	[0]	(1.8 ± 0.1)(+1)	
	5.52 → 1.27	$4^+ \rightarrow 2^+$	27 ± 4 fs	1.6 ± 0.3	[0]	(9 ± 2)(-2)	34
	6.31 → 3.36	$6^+ \rightarrow 4^+$	70 ± 10 fs	100	[0]	(1.5 ± 0.2)(+1)	34
^{22}Na	0.58 → 0	$1^+ \rightarrow 3^+$	352 ± 8 ns	100	[0]	(9.5 ± 0.3)(-3)	
	0.89 → 0	$4^+ \rightarrow 3^+$	15.0 ± 0.4 ps	100	-3.3 ± 0.2	(2.5 ± 0.2)(+1)	
	1.53 → 0	$5^+ \rightarrow 3^+$	4.9 ± 0.2 ps	93.7 ± 0.3	[0]	(5.0 ± 0.3)(0)	
	→ 0.89	$\rightarrow 4^+$		6.3 ± 0.3	-2.10 ± 0.13	(2.0 ± 0.1)(+1)	
	1.98 → 0.58	$3^+ \rightarrow 1^+$	2.3 ± 0.2 ps	96.9 ± 0.3	≈ 0	(1.8 ± 0.2)(+1)	
	3.52 → 2.21	$3^- \rightarrow 1^-$	670 ± 120 fs	23 ± 1	≈ 0	(2.0 ± 0.4)(+1)	
	→ 2.57	$\rightarrow 2^-$		5.7 ± 0.4	-2.1 ± 0.3	(2.0 ± 0.4)(+1)	
	3.71 → 0.89	$6^+ \rightarrow 4^+$	110 ± 20 fs	68 ± 3	≈ 0	(7.6 ± 1.4)(0)	
	→ 1.53	$\rightarrow 5^+$		32 ± 3	-1/(0.06 ± 0.08)	(1.3 ± 0.3)(+1)	
	4.47 → 2.57	$4^- \rightarrow 2^-$	150 ± 60 fs	66 ± 4	[0]	(4.1 ± 1.7)(+1)	
	4.71 → 1.98	$5^+ \rightarrow 3^+$	60 ± 20 fs	52 ± 2	≈ 0	(1.3 ± 0.4)(+1)	
	→ 2.97	$\rightarrow 3^+$		5 ± 1	≈ 0	(1.2 ± 0.4)(+1)	
	5.10 → 0	$4^+ \rightarrow 3^+$	55 ± 17 fs	18 ± 2	<-8	(2.1 ± 0.7)(-1)	
	→ 3.06	$\rightarrow 2^+$		18 ± 2	≈ 0	(2.1 ± 0.7)(+1)	
^{22}Mg	1.25 → 0	$2^+ \rightarrow 0^+$	3.0 ± 1.2 ps	100	0	(2.4 ± 1.0)(+1)	
	5.71 → 0	$2^+ \rightarrow 0^+$	40 ± 15 fs	13 ± 3	0	(1.2 ± 0.5)(-1)	
^{23}Ne	1.02 → 0	$1/2^+ \rightarrow 5/2^+$	257 ± 14 ps	100	[0]	(7.2 ± 0.4)(-1)	
^{23}Na	0.44 → 0	$5/2^+ \rightarrow 3/2^+$	1.60 ± 0.09 ps	100	-0.058 ± 0.003	(2.0 ± 0.3)(+1)	
	2.08 → 0	$7/2^+ \rightarrow 3/2^+$	40 ± 4 fs	9 ± 1	≈ 0	(1.3 ± 0.2)(+1)	
	→ 0.44	$\rightarrow 5/2^+$		91 ± 1	-0.19 ± 0.02	(1.3 ± 0.3)(+1)	
	2.39 → 0.44	$1/2^+ \rightarrow 5/2^+$	800 ± 150 fs	35 ± 1	[0]	(3.2 ± 0.6)(0)	
	2.70 → 0.44	$9/2^+ \rightarrow 5/2^+$	110 ± 15 fs	64 ± 1	≈ 0	(2.0 ± 0.3)(+1)	
	3.85 → 2.64	$5/2^- \rightarrow 1/2^-$	130 ± 20 fs	6 ± 1	[0]	(3.6 ± 0.8)(+1)	
	3.91 → 0	$5/2^+ \rightarrow 3/2^+$	11 ± 2 fs	82 ± 2	-0.22 ± 0.03	(8 ± 3)(-1)	
	6.35 → 3.85	$9/2^- \rightarrow 5/2^-$	37 ± 12 fs	66 ± 4	≈ 0	(3.8 ± 1.2)(+1)	
	9.70 → 2.08	$3/2^+ \rightarrow 7/2^+$	2.5 ± 0.8 eV	1.5	[0]	(4.6 ± 1.5)(-1)	
	10.01 → 0	$5/2^+ \rightarrow 3/2^+$	1.6 ± 0.5 eV	1.5	-2.0 ± 0.2	(6 ± 2)(-2)	
	→ 0.44	$\rightarrow 5/2^+$		16	-0.20 ± 0.02	(3.9 ± 1.5)(-2)	
	→ 2.08	$\rightarrow 7/2^+$		4.8	-0.30 ± 0.03	(6 ± 2)(-2)	
	10.08 → 0.44	$1/2^+ \rightarrow 5/2^+$	350 ± 110 meV	6.9	[0]	(9 ± 3)(-2)	
	10.17 → 2.70	$5/2^+ \rightarrow 9/2^+$	420 ± 130 meV	1.8	[0]	(1.0 ± 0.3)(-1)	
	10.23 → 2.39	$5/2^+ \rightarrow 1/2^+$	680 ± 200 meV	4.3	[0]	(3.1 ± 0.9)(-1)	
	10.24 → 0.44	$1/2^+ \rightarrow 5/2^+$	500 ± 150 meV	23	[0]	(4.0 ± 1.3)(-1)	
	10.34 → 2.39	$5/2^+ \rightarrow 1/2^+$	700 ± 200 meV	3.6	[0]	(2.5 ± 0.8)(-1)	
	10.348 → 2.08	$3/2^+ \rightarrow 7/2^+$	700 ± 200 meV	2.6	[0]	(1.4 ± 0.4)(-1)	
	10.51 → 0.44	$1/2^+ \rightarrow 5/2^+$	250 ± 75 meV	3.2	[0]	(2.4 ± 0.8)(-2)	
	10.52 → 2.39	$5/2^+ \rightarrow 1/2^+$	330 ± 100 meV	2.6	[0]	(8 ± 3)(-2)	
	→ 2.70	$\rightarrow 9/2^+$		1.1	[0]	(3.9 ± 1.2)(-2)	
	10.55 → 2.39	$5/2^+ \rightarrow 1/2^+$	800 ± 240 meV	9.2	[0]	(6 ± 2)(-1)	
	→ 4.43	$\rightarrow 1/2^+$		14	[0]	(4.1 ± 1.3)(0)	
^{23}Mg	2.05 → 0	$7/2^+ \rightarrow 3/2^+$	80 ± 20 fs	16 ± 2	≈ 0	(1.1 ± 0.3)(+1)	
	→ 0.45	$\rightarrow 5/2^+$		84 ± 2	+0.19 ± 0.02	(5.2 ± 1.7)(0)	
	2.36 → 0.45	$1/2^+ \rightarrow 5/2^+$	830 ± 170 fs	69 ± 2	[0]	(6.9 ± 1.4)(0)	

TABLE V. Strengths of Isospin-Allowed $E2$ Transitions ($E2_{IS}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{24}Ne	1.98 → 0	$2^+ \rightarrow 0^+$	950 ± 220 fs	100	0	(6.9 ± 1.6)(0)	
^{24}Na	0.56 → 0	$2^+ \rightarrow 4^+$	52 ± 8 ps	2.5 ± 0.5	[0]	(1.7 ± 0.4)(0)	
^{24}Mg	1.37 → 0	$2^+ \rightarrow 0^+$	1.98 ± 0.04 ps	100	0	(2.1 ± 0.1)(+1)	
	4.12 → 1.37	$4^+ \rightarrow 2^+$	55 ± 10 fs	≈100	[0]	(2.3 ± 0.4)(+1)	
	4.24 → 0	$2^+ \rightarrow 0^+$	105 ± 10 fs	78.9 ± 0.5	0	(1.0 ± 0.1)(0)	
	→ 1.37	$\rightarrow 2^+$		21.1 ± 0.5	+23 ± 9	(2.0 ± 0.2)(0)	
	5.24 → 1.37	$3^+ \rightarrow 2^+$	110 ± 15 fs	98.2 ± 0.2	+17 ± 4	(2.0 ± 0.3)(0)	
	6.01 → 1.37	$4^+ \rightarrow 2^+$	80 ± 15 fs	87 ± 1	[0]	(1.0 ± 0.2)(0)	
	→ 4.24	$\rightarrow 2^+$		13 ± 1	[0]	(1.8 ± 0.4)(+1)	
	6.43 → 1.37	$0^+ \rightarrow 2^+$	80 ± 15 fs	82 ± 2	0	(5.6 ± 1.1)(-1)	
	→ 4.24	$\rightarrow 2^+$		18 ± 2	0	(8.7 ± 1.9)(0)	
	7.35 → 0	$2^+ \rightarrow 0^+$	20 ± 5 fs	62 ± 2	0	(2.7 ± 0.7)(-1)	
	8.437 → 1.37	$4^+ \rightarrow 2^+$	13 ± 5 fs	63.0 ± 0.8	[0]	(6 ± 2)(-1)	44,48
	→ 4.24	$\rightarrow 2^+$		6.5 ± 0.5	[0]	(8 ± 3)(-1)	44,48
	8.65 → 6.43	$2^+ \rightarrow 0^+$	24 ± 7 fs	5 ± 1	0	(8 ± 3)(0)	
	9.00 → 0	$2^+ \rightarrow 0^+$	11 ± 2 fs	55 ± 3	0	(1.7 ± 0.4)(-1)	
	→ 4.12	$\rightarrow 4^+$		27 ± 3	[0]	(1.8 ± 0.4)(0)	
	9.28 → 0	$2^+ \rightarrow 0^+$		from B(E2)	0	(5.7 ± 1.0)(-1)	
	9.30 → 1.37	$4^+ \rightarrow 2^+$	10 ± 4 fs	48 ± 7	[0]	(2.9 ± 1.2)(-1)	44,48
^{25}Na	1.07 → 0	$1/2^+ \rightarrow 5/2^+$	2.3 ± $^{2.0}_{0.8}$ ps	10 ± 1	[0]	(6 ± 3)(0)	
^{25}Mg	0.59 → 0	$1/2^+ \rightarrow 5/2^+$	4.88 ± 0.07 ns	100	≈0	(5.4 ± 0.1)(-1)	
	0.97 → 0	$3/2^+ \rightarrow 5/2^+$	16.4 ± 0.9 ps	51 ± 1	-0.36 ± 0.02	(7.8 ± 0.9)(-1)	
	→ 0.59	$\rightarrow 1/2^+$		49 ± 1	-0.13 ± 0.03	(1.3 ± 0.6)(+1)	
	1.61 → 0	$7/2^+ \rightarrow 5/2^+$	21 ± 3 fs	100	+0.189 ± 0.012	(2.8 ± 0.5)(+1)	
	1.96 → 0	$5/2^+ \rightarrow 5/2^+$	1.0 ± 0.4 ps	26 ± 1	+0.60 ± 0.10	(4.4 ± 2.0)(-1)	
	→ 0.59	$\rightarrow 1/2^+$		47 ± 1	≈0	(1.8 ± 0.7)(+1)	
	→ 0.97	$\rightarrow 3/2^+$		27 ± 1	+0.25 ± 0.02	(3.0 1.3)(0)	
	2.56 → 0	$1/2^+ \rightarrow 5/2^+$		from B(E2)		(2.7 ± 0.3)(0)	
	2.74 → 0	$7/2^+ \rightarrow 5/2^+$	400 ± 40 fs	6 ± 1	+2.9 ± 0.5	(1.6 ± 0.3)(-1)	
	→ 0.97	$\rightarrow 3/2^+$		87 ± 1	≈0	(2.3 ± 0.2)(+1)	
	2.80 → 0	$3/2^+ \rightarrow 5/2^+$	40 ± 10 fs	22 ± 1	+0.64 ± 0.08	(1.7 ± 0.5)(0)	
	3.405 → 0	$9/2^+ \rightarrow 5/2^+$	10.2 ± 0.6 fs	19 ± 1	[0]	(7.5 ± 0.5)(0)	
	→ 1.61	$\rightarrow 7/2^+$		81 ± 1	+0.14 ± 0.02	(1.5 ± 0.4)(+1)	
	4.06 → 0	$9/2^+ \rightarrow 5/2^+$	76 ± 5 fs	60 ± 1	≈0	(1.3 ± 0.1)(0)	
	→ 1.61	$\rightarrow 7/2^+$		39 ± 1	+0.46 ± 0.10	(1.8 ± 0.7)(0)	
	4.71 → 1.96	$9/2^+ \rightarrow 5/2^+$	38 ± 6 fs	94 ± 1	≈0	(2.9 ± 0.5)(+1)	
	5.46 → 3.405	$13/2^+ \rightarrow 9/2^+$	2.5 ± 1.2 ps	100	≈0	(2.0 ± 0.9)(0)	
^{25}Al	0.45 → 0	$1/2^+ \rightarrow 5/2^+$	3.30 ± 0.05 ns	100	[0]	(3.0 ± 0.1)(0)	
	0.94 → 0	$3/2^+ \rightarrow 5/2^+$	6.2 ± 1.6 ps	44 ± 3	+0.34 ± 0.04	(1.8 ± 0.4)(0)	
	1.79 → 0	$5/2^+ \rightarrow 5/2^+$	520 ± 70 fs	24 ± 2	-0.82 ± 0.13	(1.8 ± 0.5)(0)	
	→ 0.45	$\rightarrow 1/2^+$		38 ± 3	≈0	(3.0 ± 0.5)(+1)	
	→ 0.94	$\rightarrow 3/2^+$		38 ± 3	-0.17 ± 0.01	(8.1 ± 1.6)(0)	
	2.72 → 0.94	$7/2^+ \rightarrow 3/2^+$	360 ± 90 fs	77 ± 3	[0]	(2.2 ± 0.6)(+1)	
	3.86 → 0.45	$5/2^+ \rightarrow 1/2^+$	95 ± 30 meV	1.0 ± 0.3	[0]	(5.6 ± 1.9)(-1)	
^{26}Mg	1.81 → 0	$2^+ \rightarrow 0^+$	700 ± 30 fs	100	0	(1.3 ± 0.1)(+1)	
	2.94 → 0	$2^+ \rightarrow 0^+$	200 ± 50 fs	10 ± 1	0	(4.0 ± 1.0)(-1)	
	→ 1.81	$\rightarrow 2^+$		90 ± 1	+0.12 ± 0.02	(6 ± 2)(0)	
	3.59 → 1.81	$0^+ \rightarrow 2^+$	9.5 ± 0.6 ps	≈100	0	(1.0 ± 0.1)(0)	
	4.32 → 1.81	$4^+ \rightarrow 2^+$	290 ± 60 fs	100	[0]	(6.0 ± 1.2)(0)	
	4.33 → 0	$2^+ \rightarrow 0^+$	80 ± 30 fs	8 ± 2	0	(1.2 ± 0.4)(-1)	
	4.35 → 2.94	$3^+ \rightarrow 2^+$	150 ± 30 fs	45 ± 3	+0.31 ± 0.06	(8 ± 3)(0)	
	4.90 → 1.81	$4^+ \rightarrow 2^+$	70 ± 25 fs	91 ± 5	≈0	(9 ± 3)(0)	
	5.29 → 0	$2^+ \rightarrow 0^+$		from B(E2)	0	(1.6 ± 0.2)(-1)	
	5.47 → 1.81	$4^+ \rightarrow 2^+$	35 ± 15 fs	16 ± 2	[0]	(1.2 ± 0.5)(0)	
	5.72 → 2.94	$4^+ \rightarrow 2^+$	135 ± 35 fs	19 ± 2	[0]	(1.5 ± 0.4)(0)	

TABLE V. Strengths of Isospin-Allowed $E2$ Transitions ($E2_{IS}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{26}Mg	5.72 → 4.35	$4^+ \rightarrow 3^+$	135 ± 35 fs	37 ± 2	+0.17 ± 0.03	(2.8 ± 1.2)(0)	
	6.26 → 1.81	$0^+ \rightarrow 2^+$	75 ± 35 fs	93 ± 4	0	(1.3 ± 0.6)(0)	
	7.10 → 0	$2^+ \rightarrow 0^+$		from B(E2)	0	(1.5 ± 0.3)(-1)	
^{26}Al	0.42 → 0	$3^+ \rightarrow 5^+$	1.80 ± 0.05 ns	100	[0]	(7.4 ± 0.2)(0)	
	2.069 → 0	$4^+ \rightarrow 5^+$	450 ± 70 fs	31 ± 2	∞	(3.2 ± 0.5)(0)	
	2.070 → 0.23	$2^+;1 \rightarrow 0^+;1$	17 ± 4 fs	4.0 ± 1.0	0	(1.9 ± 0.6)(+1)	
	2.37 → 0	$3^+ \rightarrow 5^+$	1.4 ± 0.3 ps	1.0 ± 0.3	[0]	(1.7 ± 0.6)(-2)	
	→ 1.06	$\rightarrow 1^+$		13 ± 3	[0]	(4.0 ± 1.3)(0)	
	2.55 → 0.42	$3^+ \rightarrow 3^+$	1.00 ± 0.25 ps	31 ± 2	-1.5 ± 0.4	(9 ± 3)(-1)	
	→ 1.06	$\rightarrow 1^+$		3.0 ± 0.5	[0]	(7 ± 2)(-1)	
	3.07 → 1.06	$3^+ \rightarrow 1^+$	210 ± 60 fs	14 ± 3	[0]	(3.5 ± 1.2)(0)	
	3.40 → 0	$5^+ \rightarrow 5^+$	74 ± 19 fs	39 ± 3	∞	(2.0 ± 0.5)(0)	
	→ 0.42	$\rightarrow 3^+$		55 ± 3	[0]	(5.2 ± 1.3)(0)	
	3.51 → 0	$6^+ \rightarrow 5^+$	23 ± 6 fs	100	∞	(1.5 ± 0.4)(+1)	
	3.60 → 1.06	$3^+ \rightarrow 1^+$	36 ± 10 fs	5 ± 2	[0]	(2.4 ± 1.2)(0)	
	3.67 → 1.76	$4^+ \rightarrow 2^+$	260 ± 70 fs	21 ± 3	[0]	(5.4 ± 1.6)(0)	
^{26}Si	1.80 → 0	$2^+ \rightarrow 0^+$	1.4 ± 0.6 ps	100	0	(7 ± 3)(0)	
	3.33 → 1.80	$0^+ \rightarrow 2^+$	$2.7 \pm {}^{2.3}_{1.0}$ ps	100	0	(8 ± 3)(0)	
^{27}Mg	0.98 → 0	$3/2^+ \rightarrow 1/2^+$	1.4 ± 0.3 ps	100	-0.22 ± 0.02	(6.3 ± 1.7)(0)	
	1.70 → 0	$5/2^+ \rightarrow 1/2^+$	1.2 ± 0.2 ps	100	≈0	(9.6 ± 1.6)(0)	
	1.94 → 0	$5/2^+ \rightarrow 1/2^+$	1.1 ± 0.2 ps	33 ± 1	[0]	(1.8 ± 0.4)(0)	
^{27}Al	0.84 → 0	$1/2^+ \rightarrow 5/2^+$	50 ± 2 ps	100	[0]	(8.1 ± 0.3)(0)	
	1.01 → 0	$3/2^+ \rightarrow 5/2^+$	2.12 ± 0.08 ps	97.10 ± 0.10	+0.351 ± 0.012	(7.4 ± 0.6)(0)	
	2.21 → 0	$7/2^+ \rightarrow 5/2^+$	39.1 ± 1.0 fs	100	-0.468 ± 0.009	(1.4 ± 0.1)(+1)	
	2.73 → 0.84	$5/2^+ \rightarrow 1/2^+$	13 ± 4 fs	1.80 ± 0.14	[0]	(1.0 ± 0.3)(+1)	
	→ 1.01	$\rightarrow 3/2^+$		75.7 ± 1.1	-0.115 ± 0.008	(8 ± 3)(0)	
	3.00 → 0	$9/2^+ \rightarrow 5/2^+$	88 ± 4 fs	88.6 ± 1.1	[0]	(6.9 ± 0.4)(0)	
	4.51 → 2.21	$11/2^+ \rightarrow 7/2^+$	320 ± 30 fs	77 ± 2	≈0	(6.2 ± 0.6)(0)	
	→ 3.00	$\rightarrow 9/2^+$		23 ± 2	-0.70 ± 0.10	(5.0 ± 1.2)(0)	
	4.58 → 0	$7/2^+ \rightarrow 5/2^+$	19 ± 6 fs	75 ± 3	-0.24 ± 0.03	(1.8 ± 0.6)(-1)	
	→ 1.01	$\rightarrow 3/2^+$		4.5 ± 1.5	[0]	(7 ± 3)(-1)	56
	5.67 → 0	$9/2^+ \rightarrow 5/2^+$	16 ± 4 fs	55 ± 5	[0]	(1.0 ± 0.3)(0)	
	6.51 → 2.21	$11/2^+ \rightarrow 7/2^+$	17 ± 6 fs	20 ± 6	[0]	(1.3 ± 0.6)(0)	
	→ 3.00	$\rightarrow 9/2^+$		35 ± 7	+0.33 ± 0.05	(6 ± 3)(-1)	
	7.81 → 0	$9/2^+ \rightarrow 5/2^+$	26 ± 6 fs	20 ± 5	[0]	(4.3 ± 1.5)(-2)	
	9.08 → 0	$1/2^+ \rightarrow 5/2^+$	900 ± 300 meV	0.65 ± 0.06	[0]	(2.4 ± 0.8)(-2)	
	→ 2.73	$\rightarrow 5/2^+$		0.28 ± 0.11	[0]	(6 ± 2)(-2)	
	9.40 → 0	$1/2^+ \rightarrow 5/2^+$	450 ± 130 meV	1.0	[0]	(1.5 ± 0.5)(-2)	56
	9.633 → 0	$5/2^+ \rightarrow 5/2^+$	470 ± 140 meV	23	+1.2 ± 0.2	(1.9 ± 0.6)(-1)	56
	→ 2.73	$\rightarrow 5/2^+$		11	+0.13 ± 0.03	(1.3 ± 0.4)(-2)	56
	9.76 → 0	$5/2^+ \rightarrow 5/2^+$	750 ± 200 meV	20	-0.16 ± 0.02	(1.1 ± 0.4)(-2)	56
	→ 0.84	$\rightarrow 1/2^+$		2.0	[0]	(6 ± 2)(-2)	56
	9.82 → 2.21	$3/2^+ \rightarrow 7/2^+$	850 ± 250 meV	1.0	[0]	(8 ± 3)(-2)	56
	→ 2.73	$\rightarrow 5/2^+$		21	-0.13 ± 0.03	(4.2 ± 1.7)(-2)	56
	10.02 → 0.84	$5/2^+ \rightarrow 1/2^+$	570 ± 170 meV	7.1	[0]	(1.5 ± 0.5)(-1)	56
^{27}Si	0.78 → 0	$1/2^+ \rightarrow 5/2^+$	50 ± 6 ps	100	[0]	(1.1 ± 0.1)(+1)	
	0.96 → 0	$3/2^+ \rightarrow 5/2^+$	1.8 ± 0.2 ps	94 ± 2	-0.50 ± 0.04	(2.2 ± 0.4)(+1)	
	2.16 → 0	$7/2^+ \rightarrow 5/2^+$	50 ± 7 fs	100	+0.43 ± 0.04	(1.1 ± 0.2)(+1)	
	2.65 → 0	$5/2^+ \rightarrow 5/2^+$	25 ± 10 fs	20 ± 3	+0.40 ± 0.06	(1.3 ± 0.6)(0)	
	2.91 → 0	$9/2^+ \rightarrow 5/2^+$	76 ± 8 fs	94 ± 2	≈ 0	(1.0 ± 0.1)(+1)	
	4.45 → 2.16	$11/2^+ \rightarrow 7/2^+$	450 ± 100 fs	89 ± 2	≈ 0	(5.2 ± 1.1)(0)	
^{28}Mg	1.47 → 0	$2^+ \rightarrow 0^+$	1.7 ± 0.2 fs	100	0	(1.4 ± 0.2)(+1)	
	3.86 → 1.47	$0^+ \rightarrow 2^+$	800 ± 100 fs	100	0	(2.6 ± 0.3)(0)	
	4.02 → 1.47	$4^+ \rightarrow 2^+$	150 ± 50 fs	100	≈ 0	(1.0 ± 0.3)(+1)	
	5.70 → 1.47	$0^+ \rightarrow 2^+$	300 ± 50 fs	19.5 ± 1.1	0	(7.7 ± 1.3)(-2)	

TABLE V. Strengths of Isospin-Allowed $E2$ Transitions ($E2_{IS}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{28}Al	0.97 → 0.03	$0^+ \rightarrow 2^+$	48 ± 3 ps	100	0	(3.7 ± 0.2)(0)	
	1.37 → 0	$1^+ \rightarrow 3^+$	320 ± 50 fs	4.7 ± 0.3	[0]	(2.1 ± 0.3)(0)	
	2.49 → 0.97	$2^+ \rightarrow 0^+$	105 ± 25 fs	6 ± 2	0	(1.1 ± 0.5)(+1)	
	2.58 → 0	$5^+ \rightarrow 3^+$	540 ± 60 fs	95 ± 2	[0]	(2.4 ± 0.3)(0)	
^{28}Si	1.78 → 0	$2^+ \rightarrow 0^+$	700 ± 20 fs	100	0	(1.3 ± 0.1)(+1)	
	4.62 → 1.78	$4^+ \rightarrow 2^+$	63 ± 6 fs	100	[0]	(1.3 ± 0.1)(+1)	
	4.98 → 1.78	$0^+ \rightarrow 2^+$	45 ± 10 fs	100	0	(1.1 ± 0.2)(+1)	
	6.28 → 1.78	$3^+ \rightarrow 2^+$	1.20 ± 0.12 ps	92.5 ± 0.5	-0.14 ± 0.02	(1.3 ± 0.4)(-3)	
	6.69 → 1.78	$0^+ \rightarrow 2^+$	125 ± 25 fs	100	0	(4.3 ± 0.9)(-1)	
	6.89 → 1.78	$4^+ \rightarrow 2^+$	50 ± 7 fs	100	[0]	(8.8 ± 1.2)(-1)	
	7.38 → 0	$2^+ \rightarrow 0^+$	8 ± 2 fs	37.5 ± 1.5	0	(3.4 ± 0.9)(-1)	
	7.42 → 0	$2^+ \rightarrow 0^+$	36 ± 4 fs	94 ± 2	0	(2.0 ± 0.2)(-1)	
	7.93 → 0	$2^+ \rightarrow 0^+$	18 ± 7 fs	85 ± 3	0	(2.7 ± 1.1)(-1)	41
	→ 4.62	$\rightarrow 4^+$		5 ± 1	[0]	(1.1 ± 0.5)(0)	41
	8.26 → 0	$2^+ \rightarrow 0^+$	15 ± 6 fs	9.0 ± 1.5	0	(2.4 ± 1.0)(-2)	
	→ 4.62	$\rightarrow 4^+$		4.0 ± 1.0	[0]	(7 ± 3)(-1)	
	→ 4.98	$\rightarrow 0^+$		17.0 ± 1.0	0	(4.5 ± 1.8)(0)	
	8.41 → 6.88	$4^- \rightarrow 3^-$	430 ± 90 fs	74 ± 2	-0.17 ± 0.01	(9 ± 2)(-1)	
	8.54 → 4.62	$6^+ \rightarrow 4^+$	18 ± 5 fs	100	[0]	(1.0 ± 0.3)(+1)	
	9.70 → 6.88	$5^- \rightarrow 3^-$	6 ± 2 ps	23 ± 1	[0]	(3.4 ± 1.1)(-2)	
	10.58 → 9.70	$6^- \rightarrow 5^-$	340 ± 100 fs	100	-	(1.9 ± 0.6)(+1)	
	12.073 → 0	$2^+ \rightarrow 0^+$	180 meV	55	0	(9 ± 3)(-2)	
	→ 4.62	$\rightarrow 4^+$		2.8	[0]	(5.2 ± 1.7)(-2)	
	→ 6.89	$\rightarrow 4^+$		7.0	[0]	(8 ± 3)(-1)	
	12.29 → 4.98	$2^+ \rightarrow 0^+$	230 meV	1.3	0	(3.4 ± 1.1)(-2)	
	→ 6.69	$\rightarrow 0^+$		2.4	0	(2.4 ± 0.8)(-1)	
	12.44 → 0	$2^+ \rightarrow 0^+$	240 meV	69	0	(1.3 ± 0.4)(-1)	
	→ 4.62	$\rightarrow 4^+$		3.4	[0]	(7 ± 2)(-2)	
	→ 6.89	$\rightarrow 4^+$		1.4	[0]	(1.6 ± 0.5)(-1)	
	12.48 → 1.78	$4^+ \rightarrow 2^+$	480 meV	91	[0]	(7 ± 2)(-1)	
	→ 7.93	$\rightarrow 2^+$		1.0	[0]	(6 ± 2)(-1)	
	→ 8.26	$\rightarrow 2^+$		1.1	[0]	(1.0 ± 0.3)(0)	
	12.55 → 1.78	$4^+ \rightarrow 2^+$	125 meV	64	[0]	(1.3 ± 0.4)(-1)	
	→ 7.38	$\rightarrow 2^+$		4.0	[0]	(3.2 ± 1.1)(-1)	
	→ 7.42	$\rightarrow 2^+$		10	[0]	(8 ± 3)(-1)	
	→ 7.93	$\rightarrow 2^+$		5.2	[0]	(7 ± 2)(-1)	
	→ 8.26	$\rightarrow 2^+$		3.2	[0]	(6 ± 2)(-1)	
	12.73 → 0	$2^+ \rightarrow 0^+$	900 meV	63	0	(4.1 ± 1.4)(-1)	
	→ 4.98	$\rightarrow 0^+$		6.0	0	(4.7 ± 1.6)(-1)	
	12.86 → 1.78	$4^+ \rightarrow 2^+$	430 meV	12	[0]	(1.2 ± 0.4)(-1)	
	13.09 → 1.78	$4^+ \rightarrow 2^+$	120 meV	5.6	[0]	(9 ± 3)(-3)	
	→ 7.42	$\rightarrow 2^+$		1.4	[0]	(7 ± 2)(-2)	
	→ 8.26	$\rightarrow 2^+$		5.7	[0]	(6 ± 2)(-1)	
	→ 9.48	$\rightarrow 2^+$		1.7	[0]	(7 ± 2)(-1)	
^{29}Al	1.40 → 0	$1/2^+ \rightarrow 5/2^+$	6.5 ± 0.5 ps	100	[0]	(4.4 ± 0.4)(0)	
	1.75 → 0	$7/2^+ \rightarrow 5/2^+$	40 ± 15 fs	100	-0.16 ± 0.02	(6 ± 3)(0)	
	3.18 → 1.40	$5/2^+ \rightarrow 1/2^+$	180 ± 30 fs	14 ± 1	≈0	(6.5 ± 1.1)(0)	
	→ 1.75	$\rightarrow 7/2^+$		24 ± 2	-0.26 ± 0.06	(2.1 ± 1.0)(0)	
^{29}Si	1.27 → 0	$3/2^+ \rightarrow 1/2^+$	400 ± 30 fs	100	-0.197 ± 0.009	(4.4 ± 0.5)(0)	
	2.03 → 0	$5/2^+ \rightarrow 1/2^+$	420 ± 30 fs	94.0 ± 0.5	[0]	(1.0 ± 0.1)(+1)	
	2.43 → 0	$3/2^+ \rightarrow 1/2^+$	20 ± 5 fs	87 ± 1	+0.32 ± 0.07	(7 ± 3)(0)	
	3.07 → 1.27	$5/2^+ \rightarrow 3/2^+$	20 ± 6 fs	80 ± 4	-0.26 ± 0.02	(2.0 ± 0.7)(+1)	
	4.08 → 1.27	$7/2^+ \rightarrow 3/2^+$	50 ± 8 fs	68 ± 5	≈0	(1.2 ± 0.2)(+1)	
	4.74 → 2.03	$9/2^+ \rightarrow 5/2^+$	40 ± 8 fs	93 ± 1	≈0	(2.5 ± 0.5)(+1)	
	4.90 → 0	$5/2^+ \rightarrow 1/2^+$	10 ± 3 fs	18 ± 4	≈0	(1.0 ± 0.4)(0)	

TABLE V. Strengths of Isospin-Allowed $E2$ Transitions ($E2_{IS}$)
See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{29}Si	5.25 → 3.62	$9/2^- \rightarrow 7/2^-$	90 ± 15 fs	100	-0.43 ± 0.02	(2.2 ± 0.4)(+1)	
	5.65 → 3.07	$9/2^+ \rightarrow 5/2^+$	40 ± 15 fs	41 ± 2	≈ 0	(1.4 ± 0.5)(+1)	
	5.81 → 2.03	$7/2^+ \rightarrow 5/2^+$	20 ± 9 fs	25 ± 3	+2.0 ± 0.2	(1.9 ± 0.9)(0)	
	→ 2.43	$\rightarrow 3/2^+$		30 ± 3	[0]	(5 ± 2)(0)	
^{29}P	1.38 → 0	$3/2^+ \rightarrow 1/2^+$	200 ± 30 fs	100	+0.17 ± 0.02	(4.2 ± 1.2)(0)	
	1.95 → 0	$5/2^+ \rightarrow 1/2^+$	360 ± 40 fs	92 ± 1	≈ 0	(1.4 ± 0.2)(+1)	
	2.42 → 0	$3/2^+ \rightarrow 1/2^+$	30 ± 8 fs	84 ± 3	-0.22 ± 0.02	(2.3 ± 0.7)(0)	
^{30}Si	2.24 → 0	$2^+ \rightarrow 0^+$	360 ± 20 fs	100	0	(7.0 ± 0.4)(0)	
	3.50 → 0	$2^+ \rightarrow 0^+$	83 ± 7 fs	44.7 ± 1.5	0	(1.5 ± 0.2)(0)	
	→ 2.24	$\rightarrow 2^+$		55.3 ± 1.5	-0.18 ± 0.04	(1.0 ± 0.4)(+1)	
	3.79 → 2.24	$0^+ \rightarrow 2^+$	14 ± 2 ps	≈ 100	0	(1.1 ± 0.2)(0)	
	4.81 → 0	$2^+ \rightarrow 0^+$	170 ± 45 fs	36 ± 2	0	(1.1 ± 0.3)(-1)	
	→ 2.24	$\rightarrow 2^+$		16 ± 1	-0.52 ± 0.11	(2.6 ± 1.1)(-1)	
	4.83 → 2.24	$3^+ \rightarrow 2^+$	145 ± 30 fs	92 ± 3	-0.65 ± 0.11	(2.3 ± 0.7)(0)	
	5.28 → 2.24	$4^+ \rightarrow 2^+$	120 ± 30 fs	100	≈ 0	(4.6 ± 1.2)(0)	
	5.37 → 2.24	$0^+ \rightarrow 2^+$	85 ± 30 fs	71 ± 11	0	(3.9 ± 1.5)(0)	
	5.95 → 2.24	$4^+ \rightarrow 2^+$	24 ± 8 fs	100	≈ 0	(8 ± 3)(0)	
	7.04 → 5.49	$5^- \rightarrow 3^-$	1.3 ± 0.3 ps	9 ± 2	[0]	(1.1 ± 0.4)(0)	
^{30}P	1.45 → 0	$2^+ \rightarrow 1^+$	7.6 ± 1.6 ps	95 ± 1	+0.22 ± 0.02	(1.3 ± 0.4)(-1)	
	1.97 → 0	$3^+ \rightarrow 1^+$	4.9 ± 1.8 ps	41 ± 5	≈ 0	(4.2 ± 1.6)(-1)	
	→ 0.71	$\rightarrow 1^+$		59 ± 5	≈ 0	(5.2 ± 1.9)(0)	
	2.54 → 0	$3^+ \rightarrow 1^+$	225 ± 35 fs	95 ± 4	≈ 0	(6.0 ± 0.9)(0)	
	2.72 → 0	$2^+ \rightarrow 1^+$	170 ± 25 fs	100	-3.0 ± 0.4	(5.1 ± 0.8)(0)	
	2.84 → 0	$3^+ \rightarrow 1^+$	900 ± 200 fs	19 ± 3	[0]	(1.8 ± 0.5)(-1)	
	→ 0.71	$\rightarrow 1^+$		49 ± 2	[0]	(2.2 ± 0.5)(0)	
	2.94 → 0.68	$2^+;1 \rightarrow 0^+;1$	105 ± 20 fs	32 ± 2	0	(7.4 ± 1.5)(0)	
	4.42 → 0	$2^+ \rightarrow 1^+$	50 ± 15 fs	100	-19 ± 8	(1.7 ± 0.5)(0)	
^{30}S	2.21 → 0	$2^+ \rightarrow 0^+$	185 ± 35 fs	100	0	(1.5 ± 0.3)(+1)	
	3.40 → 0	$2^+ \rightarrow 0^+$	135 ± 30 fs	20 ± 3	0	(4.7 ± 1.3)(-1)	
^{31}Si	1.69 → 0	$5/2^+ \rightarrow 3/2^+$	820 ± 160 fs	100	-4.4 ± 0.7	(1.2 ± 0.2)(+1)	
^{31}P	1.27 → 0	$3/2^+ \rightarrow 1/2^+$	750 ± 50 fs	100	+0.30 ± 0.01	(4.5 ± 0.4)(0)	
	2.23 → 0	$5/2^+ \rightarrow 1/2^+$	361 ± 13 fs	100	[0]	(7.0 ± 0.3)(0)	
	3.30 → 0	$3/2^+ \rightarrow 1/2^+$	115 ± 20 fs	1.1 ± 0.2	[0]	(3.3 ± 0.8)(-2)	
	→ 1.27	$\rightarrow 3/2^+$		78.2 ± 1.0	-0.40 ± 0.02	(3.9 ± 0.8)(0)	
	→ 2.23	$\rightarrow 5/2^+$		20.7 ± 1.0	-0.40 ± 0.05	(2.4 ± 0.5)(+1)	
	3.41 → 1.27	$7/2^+ \rightarrow 3/2^+$	315 ± 40 fs	97.3 ± 0.5	[0]	(9.0 ± 1.1)(0)	
	→ 2.23	$\rightarrow 5/2^+$		2.7 ± 0.5	+0.35 ± 0.07	(5.6 ± 2.0)(-1)	
	3.51 → 0	$3/2^+ \rightarrow 1/2^+$	12.1 ± 1.9 fs	59 ± 2	-0.43 ± 0.02	(1.9 ± 0.3)(0)	
	4.26 → 0	$3/2^+ \rightarrow 1/2^+$	15 ± 5 fs	74.2 ± 1.5	-0.35 ± 0.03	(5.3 ± 1.9)(-1)	
	→ 1.27	$\rightarrow 3/2^+$		25.8 ± 1.5	-0.25 ± 0.04	(6 ± 3)(-1)	
	4.63 → 1.27	$7/2^+ \rightarrow 3/2^+$	110 ± 15 fs	3.0 ± 0.7	[0]	(9 ± 3)(-2)	
	→ 2.23	$\rightarrow 5/2^+$		26.3 ± 1.0	-0.45 ± 0.06	(7.1 ± 1.9)(-1)	
	→ 3.30	$\rightarrow 5/2^+$		34.5 ± 1.5	-0.38 ± 0.04	(1.3 ± 0.3)(+1)	
	→ 3.41	$\rightarrow 7/2^+$		36.2 ± 1.0	-0.33 ± 0.06	(1.7 ± 0.6)(+1)	
	4.78 → 0	$5/2^+ \rightarrow 1/2^+$	12 ± 4 fs	43.4 ± 1.5	≈ 0	(2.0 ± 0.5)(0)	
	5.34 → 2.23	$9/2^+ \rightarrow 5/2^+$	60 ± 15 fs	13 ± 3	[0]	(1.0 ± 0.3)(0)	
	→ 3.30	$\rightarrow 5/2^+$		5 ± 2	≈0	(3.2 ± 1.3)(0)	
	5.89 → 2.23	$9/2^+ \rightarrow 5/2^+$	33 ± 8 fs	91 ± 2	≈0	(5.6 ± 1.4)(0)	
	6.08 → 2.23	$9/2^+ \rightarrow 5/2^+$	32 ± 15 fs	88 ± 2	≈0	(5 ± 2)(0)	
	6.45 → 3.41	$11/2^+ \rightarrow 7/2^+$	33 ± 12 fs	89 ± 4	≈0	(1.4 ± 0.5)(+1)	
	6.501 → 4.43	$9/2^- \rightarrow 7/2^-$	55 ± 17 fs	75 ± 5	-1.3 ± 0.3	(3.2 ± 1.3)(+1)	
	6.79 → 4.43	$9/2^- \rightarrow 7/2^-$	205 ± 40 fs	75 ± 8	+0.29 ± 0.04	(6 ± 2)(-1)	
	6.83 → 4.43	$11/2^- \rightarrow 7/2^-$	120 ± 50 fs	60 ± 10	[0]	(9 ± 4)(0)	
	8.46 → 1.27	$5/2^+ \rightarrow 3/2^+$	200 ± 70 meV	4.0	-0.100 ± 0.005	(1.1 ± 0.4)(-3)	
	→ 2.23	$\rightarrow 5/2^+$		26	-0.100 ± 0.011	(1.3 ± 0.4)(-2)	

TABLE V. Strengths of Isospin-Allowed $E2$ Transitions ($E2_{IS}$)

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Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i;T_i \rightarrow J_f;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{31}P	8.46 → 3.13	$5/2^+ \rightarrow 1/2^+$	200 ± 70 meV	1.4	[0]	(1.6 ± 0.5)(-1)	
	8.64 → 1.27	$5/2^+ \rightarrow 3/2^+$	510 ± 150 meV	51	+0.042 ± 0.003	(4.4 ± 1.5)(-3)	
	8.757 → 1.27	$5/2^+ \rightarrow 3/2^+$	510 ± 150 meV	55	-0.206 ± 0.003	(1.0 ± 0.3)(-1)	
	→ 3.13	$\rightarrow 1/2^+$		1.0	[0]	(2.0 ± 0.7)(-1)	
	8.90 → 2.23	$1/2^+ \rightarrow 5/2^+$	370 ± 110 meV	1.3	[0]	(8 ± 3)(-2)	
	8.91 → 1.27	$5/2^+ \rightarrow 3/2^+$	120 ± 35 meV	24	-0.07 ± 0.01	(1.2 ± 0.5)(-3)	
	9.01 → 0	$5/2^+ \rightarrow 1/2^+$	400 ± 120 meV	13	[0]	(1.8 ± 0.6)(-1)	
	→ 2.23	$\rightarrow 5/2^+$		6.0	-0.64 ± 0.10	(6 ± 2)(-2)	
	9.07 → 0	$5/2^+ \rightarrow 1/2^+$	490 ± 150 meV	1.4	[0]	(2.3 ± 0.8)(-2)	
	→ 2.23	$\rightarrow 5/2^+$		42	+0.07 ± 0.01	(1.5 ± 0.6)(-2)	
	9.12 → 2.23	$5/2^+ \rightarrow 5/2^+$	700 ± 200 meV	49	+0.07 ± 0.01	(2.3 ± 0.9)(-2)	
	9.129 → 0	$5/2^+ \rightarrow 1/2^+$	85 ± 25 meV	7.0	[0]	(1.7 ± 0.6)(-2)	
	→ 2.23	$\rightarrow 5/2^+$		18	-1.18 ± 0.09	(1.2 ± 0.4)(-1)	
	→ 5.89	$\rightarrow 9/2^+$		6.1	[0]	(3.1 ± 1.0)(0)	
^{31}S	1.25 → 0	$3/2^+ \rightarrow 1/2^+$	720 ± 180 fs	100	-0.35 ± 0.02	(6.8 ± 1.8)(0)	
	2.24 → 0	$5/2^+ \rightarrow 1/2^+$	320 ± 80 fs	100	[0]	(7.6 ± 1.9)(0)	
^{32}Si	1.94 → 0	$2^+ \rightarrow 0^+$	620 ± 200 fs	100	0	(8 ± 2)(0)	
	4.23 → 0	$2^+ \rightarrow 0^+$	380 ± 130 fs	62 ± 3	0	(1.6 ± 0.6)(-1)	
^{32}P	1.75 → 0	$3^+ \rightarrow 1^+$	510 ± 55 fs	2.1 ± 0.5	≈0	(3.3 ± 0.9)(-1)	
	→ 0.08	$\rightarrow 2^+$		95.9 ± 0.5	+0.79 ± 0.08	(6.9 ± 1.1)(0)	
	2.18 → 0	$3^+ \rightarrow 1^+$	62 ± 11 fs	9.0 ± 0.9	≈0	(3.8 ± 0.8)(0)	
	→ 0.08	$\rightarrow 2^+$		91.0 ± 0.9	-0.14 ± 0.03	(9 ± 4)(-1)	
	3.00 → 0	$3^+ \rightarrow 1^+$	60 ± 20 fs	6.7 ± 0.6	≈0	(6 ± 2)(-1)	
	→ 1.32	$\rightarrow 2^+$		4.4 ± 0.5	+1.7 ± 0.8	(5 ± 2)(0)	
	3.15 → 0.08	$4^+ \rightarrow 2^+$	520 ± 60 fs	7.1 ± 0.3	≈0	(6.6 ± 0.9)(-2)	
	→ 1.32	$\rightarrow 2^+$		59.4 ± 0.6	≈0	(7.4 ± 1.0)(0)	
	→ 1.75	$\rightarrow 3^+$		13.4 ± 0.6	+4.8 ± 1.2	(6.0 ± 0.7)(0)	
	4.28 → 3.443	$5^- \rightarrow 4^-$	770 ± 120 fs	77.0 ± 1.2	+0.14 ± 0.02	(6 ± 2)(0)	
^{32}S	2.23 → 0	$2^+ \rightarrow 0^+$	246 ± 9 fs	100	0	(1.0 ± 0.1)(+1)	
	3.78 → 2.23	$0^+ \rightarrow 2^+$	1.05 ± 0.20 ps	100	0	(1.4 ± 0.2)(+1)	
	4.28 → 0	$2^+ \rightarrow 0^+$	55 ± 8 fs	85.9 ± 0.6	0	(1.4 ± 0.2)(0)	
	→ 2.23	$\rightarrow 2^+$		14.1 ± 0.6	>12	(9.3 ± 1.3)(0)	
	4.46 → 2.23	$4^+ \rightarrow 2^+$	200 ± 40 fs	100	[0]	(1.2 ± 0.2)(+1)	
	5.41 → 2.23	$3^+ \rightarrow 2^+$	150 ± 30 fs	100	>20	(2.7 ± 0.5)(0)	
	5.55 → 0	$2^+ \rightarrow 0^+$	80 ± 20 fs	40 ± 1	0	(1.2 ± 0.3)(-1)	
	6.41 → 2.23	$4^+ \rightarrow 2^+$	35 ± 8 fs	100	≈ 0	(3.0 ± 0.7)(0)	
	6.62 → 5.01	$4^- \rightarrow 3^-$	650 ± 100 fs	74 ± 3	-5.7 ± 0.3	(1.0 ± 0.2)(+1)	
	7.95 → 5.01	$4^- \rightarrow 3^-$	125 ± 20 fs	60 ± 10	+10 ± 3	(2.8 ± 0.7)(0)	
	9.46 → 0	$2^+ \rightarrow 0^+$	600 meV	51	0	(8 ± 3)(-1)	
	9.49 → 5.01	$1^- \rightarrow 3^-$	370 meV	3.5	[0]	(1.4 ± 0.5)(0)	
	9.71 → 0	$2^+ \rightarrow 0^+$	160 meV	7	0	(2.6 ± 0.9)(-2)	
^{33}P	1.43 → 0	$3/2^+ \rightarrow 1/2^+$	650 ± 80 fs	100	+0.60 ± 0.09	(7.4 ± 1.9)(0)	
	1.85 → 0	$5/2^+ \rightarrow 1/2^+$	1.2 ± 0.2 ps	93 ± 2	≈ 0	(4.6 ± 0.8)(0)	
	3.49 → 0	$5/2^+ \rightarrow 1/2^+$	90 ± 20 fs	7 ± 2	≈ 0	(1.9 ± 0.7)(-1)	
	3.63 → 1.43	$7/2^+ \rightarrow 3/2^+$	200 ± 35 fs	70 ± 2	≈ 0	(8.5 ± 1.5)(0)	
	5.45 → 4.23	$9/2^- \rightarrow 7/2^-$	35 ± 7 ps	100	-0.9 ± 0.1	(6.0 ± 1.4)(-1)	
	5.64 → 4.23	$11/2^- \rightarrow 7/2^-$	14 ± 2 ps	54 ± 2	[0]	(9.0 ± 1.3)(-1)	
^{33}S	0.84 → 0	$1/2^+ \rightarrow 3/2^+$	1.69 ± 0.04 ps	100	±0.151 ± 0.004	(3.8 ± 0.2)(0)	
	1.97 → 0	$5/2^+ \rightarrow 3/2^+$	150 ± 20 fs	100	+0.56 ± 0.03	(7.0 ± 1.1)(0)	
	2.31 → 0	$3/2^+ \rightarrow 3/2^+$	155 ± 25 fs	33 ± 2	+1/(0.03 ± 0.02)	(4.1 ± 0.7)(0)	
	→ 0.84	$\rightarrow 1/2^+$		67 ± 2	+0.35 ± 0.03	(8.6 ± 1.9)(0)	
	2.87 → 0	$5/2^+ \rightarrow 3/2^+$	27 ± 12 fs	100	-0.114 ± 0.009	(3.2 ± 1.5)(-1)	
	2.97 → 0	$7/2^+ \rightarrow 3/2^+$	90 ± 15 fs	91 ± 2	≈ 0	(5.6 ± 0.9)(0)	
	4.048 → 1.97	$9/2^+ \rightarrow 5/2^+$	305 ± 50 fs	87 ± 1	≈ 0	(9.5 ± 1.6)(0)	
	→ 2.97	$\rightarrow 7/2^+$		10 ± 1	+0.34 ± 0.04	(3.0 ± 0.8)(0)	

TABLE V. Strengths of Isospin-Allowed $E2$ Transitions ($E2_{IS}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \to E_{xf}$ (MeV)	$J_i^\pi;T_i \to J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{33}S	4.09 → 0	$7/2^+ \to 3/2^+$	45 ± 7 fs	5 ± 1	[0]	(1.2 ± 0.3)(-1)	
	→ 1.97	$\to 5/2^+$		88 ± 1	-0.26 ± 0.05	(3.7 ± 1.5)(0)	
	4.73 → 2.93	$9/2^- \to 7/2^-$	82 ± 13 fs	18 ± 1	-1.2 ± 0.5	(9 ± 3)(0)	
	4.87 → 2.93	$11/2^- \to 7/2^-$	360 ± 55 fs	100	≈0	(1.3 ± 0.2)(+1)	
^{33}Cl	1.99 → 0	$5/2^+ \to 3/2^+$	80 ± 15 fs	100	-0.42 ± 0.10	(8 ± 4)(0)	
	2.35 → 0	$3/2^+ \to 3/2^+$	100 ± 30 fs	26 ± 2	-1.3 ± 0.4	(2.9 ± 1.1)(0)	
	→ 0.81	$\to 1/2^+$		74 ± 2	-0.41 ± 0.08	(1.5 ± 0.7)(+1)	
	4.78 → 2.85	$7/2^- \to 3/2^-$	1.6 ± 0.5 meV	9 ± 2	[0]	(1.0 ± 0.3)(0)	
^{34}S	2.13 → 0	$2^+ \to 0^+$	480 ± 20 fs	100	0	(5.7 ± 0.3)(0)	
	3.30 → 0	$2^+ \to 0^+$	192 ± 13 fs	44.1 ± 1.1	0	(7.2 ± 0.5)(-1)	
	→ 2.13	$\to 2^+$		55.9 ± 1.1	+0.16 ± 0.02	(4.1 ± 1.0)(0)	
	3.91 → 2.13	$0^+ \to 2^+$	1.60 ± 0.25 ps	≈ 100	0	(4.3 ± 0.7)(0)	
	4.11 → 0	$2^+ \to 0^+$	100 ± 15 fs	56 ± 2	0	(5.9 ± 0.9)(-1)	
	→ 2.13	$\to 2^+$		44 ± 2	+0.47 ± 0.10	(3.1 ± 1.2)(0)	
	4.69 → 2.13	$4^+ \to 2^+$	125 ± 15 fs	100	≈ 0	(8.7 ± 1.0)(0)	
	5.69 → 4.62	$5^- \to 3^-$	54 ± 2 ps	48 ± 2	≈ 0	(7.7 ± 0.4)(-1)	
	6.250 → 4.88	$4^+ \to 3^+$	390 ± 80 fs	46 ± 5	$+3.7 \pm {}^{2.6}_{0.7}$	(2.8 ± 0.6)(+1)	
	6.86 → 4.62	$5^- \to 3^-$	39 ± 9 fs	24 ± 2	[0]	(1.3 ± 0.3)(+1)	
	7.79 → 5.69	$6^- \to 5^-$	115 ± 35 fs	83	+1.7 ± 0.2	(1.6 ± 0.4)(+1)	
^{34}Cl	1.23 → 0.15	$2^+ \to 3^+$	19.7 ± 1.3 ps	27 ± 1	-1.6 ± 1.2	(8 ± 3)(-1)	
	→ 0.46	$\to 1^+$		36 ± 1	-1.4 ± 0.6	(5.2 ± 1.5)(0)	
	→ 0.67	$\to 1^+$		37 ± 1	-0.38 ± 0.07	(5.3 ± 1.7)(0)	
	1.89 → 0.46	$2^+ \to 1^+$	1.7 ± 0.7 ps	60 ± 2	+1.8 ± 0.2	(5 ± 2)(0)	
	2.16 → 0	$2^+;1 \to 0^+;1$	50 ± 10 fs	14 ± 1	0	(7.1 ± 1.5)(0)	
	2.18 → 0.46	$3^+ \to 1^+$	500 ± 100 fs	41 ± 2	[0]	(6.6 ± 1.3)(0)	
	→ 0.67	$\to 1^+$		12 ± 1	[0]	(3.8 ± 0.8)(0)	
	2.38 → 0.15	$4^+ \to 3^+$	225 ± 35 fs	99.0 ± 0.5	-6.0 ± 1.8	(1.0 ± 0.2)(+1)	
	2.61 → 0.67	$3^+ \to 1^+$	820 ± 350 fs	18 ± 1	[0]	(1.0 ± 0.4)(0)	
	3.60 → 2.72	$4^- \to 2^-$	23 ± 5 ps	46 ± 2	[0]	(4.6 ± 1.0)(0)	37
^{34}Ar	2.09 → 0	$2^+ \to 0^+$	230 ± 70 fs	100	0	(1.3 ± 0.4)(+1)	
	3.29 → 0	$2^+ \to 0^+$	155 ± 40 fs	11 ± 3	0	(2.2 ± 0.8)(-1)	
^{35}Cl	1.22 → 0	$1/2^+ \to 3/2^+$	220 ± 30 fs	100	±0.106 ± 0.008	(2.2 ± 0.4)(0)	
	1.76 → 0	$5/2^+ \to 3/2^+$	600 ± 40 fs	100	+2.85 ± 0.10	(1.1 ± 0.1)(+1)	
	2.65 → 0	$7/2^+ \to 3/2^+$	275 ± 40 fs	90.6 ± 1.0	[0]	(3.0 ± 0.4)(0)	
	→ 1.76	$\to 5/2^+$		9.4 ± 1.0	+0.25 ± 0.05	(4.4 ± 1.8)(0)	
	2.69 → 0	$3/2^+ \to 3/2^+$	35 ± 10 fs	79 ± 2	+0.26 ± 0.03	(1.2 ± 0.4)(0)	
	3.94 → 1.76	$9/2^+ \to 5/2^+$	290 ± 50 fs	92 ± 2	[0]	(7.5 ± 1.3)(0)	
	4.11 → 0	$7/2^+ \to 3/2^+$	70 ± 16 fs	52 ± 3	≈ 0	(7.4 ± 1.7)(-1)	
	→ 1.76	$\to 5/2^+$		48 ± 3	+0.16 ± 0.02	(2.8 ± 0.9)(-1)	
	5.41 → 3.16	$11/2^- \to 7/2^-$	400 ± 140 fs	82.8 ± 0.7	[0]	(4.3 ± 1.5)(0)	
	6.09 → 4.35	$13/2^- \to 9/2^-$	8.9 ± 0.7 ps	15 ± 5	[0]	(1.2 ± 0.4)(-1)	
	8.57 → 1.22	$5/2^+ \to 1/2^+$	480 ± 140 meV	5.4	[0]	(1.1 ± 0.4)(-1)	
	8.63 → 4.35	$7/2^- \to 9/2^-$	340 ± 100 meV	12	+0.184 ± 0.014	(1.9 ± 0.6)(-1)	
	→ 5.16	$\to 7/2^-$		8.4	-0.60 ± 0.10	(2.7 ± 0.9)(0)	
	8.825 → 1.76	$1/2^+ \to 5/2^+$	1.9 ± 0.6 eV	16	[0]	(3.0 ± 1.0)(0)	
	→ 3.00	$\to 5/2^+$		37	[0]	(1.8 ± 0.6)(+1)	
	8.908 → 3.94	$5/2^+ \to 9/2^+$	350 ± 110 meV	13	[0]	(2.6 ± 0.9)(0)	
^{36}S	3.29 → 0	$2^+ \to 0^+$	110 ± 30 fs	100	0	(2.7 ± 0.7)(0)	
^{36}Cl	0.79 → 0	$3^+ \to 2^+$	19.9 ± 1.7 ps	100	-1.1 ± 0.2	(1.0 ± 0.2)(+1)	
	1.16 → 0	$1^+ \to 2^+$	9.2 ± 0.6 ps	100	+0.32 ± 0.06	(5.5 ± 1.9)(-1)	
	2.81 → 1.95	$4^- \to 2^-$	4.1 ± 0.8 ps	10 ± 2	≈ 0	(5.9 ± 1.6)(0)	
	8.579 → 0.79	$2^+ \to 3^+$	500 ± 20 meV	9.2 ± 0.4	+0.22 ± 0.02	(1.3 ± 0.2)(-2)	
	→ 1.16	$\to 1^+$		10.7 ± 0.5	-0.14 ± 0.03	(8 ± 3)(-3)	
^{36}Ar	1.97 → 0	$2^+ \to 0^+$	460 ± 40 fs	100	0	(8.4 ± 0.7)(0)	
	4.41 → 1.97	$4^+ \to 2^+$	110 ± 15 fs	100	≈ 0	(1.2 ± 0.2)(+1)	

TABLE V. Strengths of Isospin-Allowed $E2$ Transitions ($E2_{IS}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \to E_{xf}$ (MeV)	$J_i^\pi;T_i \to J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{36}Ar	4.44 → 0	$2^+ \to 0^+$	110 ± 20 fs	65 ± 3	0	(4.0 ± 0.7)(-1)	
	→ 1.97	$\to 2^+$		35 ± 3	|δ|>1.5	(3.9 ± 1.9)(0)	
	5.17 → 4.18	$5^- \to 3^-$	127 ± 5 ps	82.4 ± 0.4	≈ 0	(7.7 ± 0.3)(-1)	
	5.90 → 4.18	$4^- \to 3^-$	500 ± 200 fs	100	-0.16 ± 0.02	(3.9 ± 1.6)(-1)	
	6.22 → 4.18	$5^- \to 3^-$	290 ± 50 fs	90.6 ± 1.3	≈ 0	(1.0 ± 0.2)(+1)	
	6.36 → 1.97	$4^+ \to 2^+$	440 ± 150 fs	49 ± 2	[0]	(8 ± 3)(-2)	
	→ 4.44	$\to 2^+$		14 ± 3	[0]	(1.4 ± 0.5)(0)	
	6.835 → 4.97	$4^- \to 2^-$	800 ± 250 fs	40 ± 2	[0]	(2.5 ± 0.8)(0)	
	6.837 → 4.18	$3^- \to 3^-$	240 ± 60 fs	57 ± 5	+1.9 ± 0.5	(1.6 ± 0.5)(0)	
	→ 5.17	$\to 5^-$		30 ± 5	≈ 0	(1.2 ± 0.3)(+1)	
	7.35 → 5.17	$6^- \to 5^-$	180 ± 40 fs	100	+6.0 ± 0.9	(1.2 ± 0.3)(+1)	
	7.57 → 4.97	$4^- \to 2^-$	230 ± 70 fs	8.3 ± 0.8	[0]	(3.5 ± 1.2)(-1)	
	9.36 → 0	$2^+ \to 0^+$	80 meV	68	0	(1.3 ± 0.4)(-1)	
	9.466 → 0	$2^+ \to 0^+$	170 meV	42	0	(1.6 ± 0.5)(-1)	
	→ 4.41	$\to 4^+$		1.0	[0]	(9 ± 3)(-2)	
^{37}Cl	1.73 → 0	$1/2^+ \to 3/2^+$	185 ± 30 fs	100	±0.25 ± 0.02	(2.2 ± 0.4)(0)	
	3.09 → 0	$5/2^+ \to 3/2^+$	45 ± 15 fs	100	-1.5 ± 0.4	(6 ± 2)(0)	
	4.011 → 3.10	$9/2^- \to 7/2^-$	33 ± 2 ps	69 ± 1	-0.64 ± 0.08	(1.1 ± 0.2)(0)	
^{37}Ar	2.22 → 0	$7/2^+ \to 3/2^+$	500 ± 80 fs	100	≈0	(4.0 ± 0.6)(0)	
	2.49 → 1.61	$3/2^- \to 7/2^-$	810 ± 150 fs	7.0 ± 0.5	[0]	(1.8 ± 0.3)(+1)	
	2.80 → 0	$5/2^+ \to 3/2^+$	20 ± 6 fs	98 ± 1	-0.16 ± 0.01	(8 ± 3)(-1)	
	3.17 → 0	$5/2^+ \to 3/2^+$	80 ± 10 fs	100	+0.47 ± 0.08	(8 ± 2)(-1)	
	3.19 → 1.61	$9/2^- \to 7/2^-$	295 ± 30 fs	100	-0.60 ± 0.04	(1.0 ± 0.1)(+1)	
	3.27 → 1.61	$5/2^- \to 7/2^-$	45 ± 8 fs	47 ± 2	+0.27 ± 0.04	(6.1 ± 2.0)(0)	
	3.53 → 1.61	$7/2^- \to 7/2^-$	590 ± 110 fs	67 ± 1	+3.1 ± 1.0	(4.2 ± 0.8)(0)	
	3.60 → 0	$3/2^+ \to 3/2^+$	65 ± 15 fs	100	+0.25 ± 0.05	(1.6 ± 0.7)(-1)	
	3.71 → 1.61	$11/2^- \to 7/2^-$	370 ± 60 fs	85 ± 1	≈0	(6.0 ± 1.0)(0)	
	4.02 → 1.61	$9/2^- \to 7/2^-$	40 ± 15 fs	6.0 ± 0.2	-1.9 ± 0.4	(1.6 ± 0.6)(0)	
	5.21 → 2.22	$11/2^+ \to 7/2^+$	3.6 ± 0.3 ps	20 ± 2	≈0	(2.6 ± 0.3)(-2)	
	5.79 → 3.19	$13/2^- \to 9/2^-$	125 ± 30 fs	40 ± 10	≈0	(2.9 ± 1.0)(0)	
	6.15 → 5.21	$13/2^+ \to 11/2^+$	4.6 ± 0.5 ps	75 ± 5	-0.10 ± 0.01	(2.5 ± 0.6)(-1)	
	6.47 → 5.21	$15/2^+ \to 11/2^+$	6.8 ± 0.5 ps	5 ± 2	≈0	(2.5 ± 1.0)(-1)	
^{38}Cl	1.31 → 0	$4^- \to 2^-$	530 ± 80 fs	6.5 ± 0.7	[0]	(3.4 ± 0.6)(0)	
	1.62 → 0.67	$3^- \to 5^-$	2.2 ± 0.2 ps	3.3 ± 0.4	[0]	(2.1 ± 0.3)(0)	
^{38}Ar	2.17 → 0	$2^+ \to 0^+$	680 ± 30 fs	100	0	(3.2 ± 0.2)(0)	
	3.38 → 2.17	$0^+ \to 2^+$	29 ± 3 ps	99.34 ± 0.10	0	(1.4 ± 0.1)(0)	
	3.94 → 0	$2^+ \to 0^+$	75 ± 35 fs	93.8 ± 0.7	0	(1.4 ± 0.6)(0)	
	4.59 → 3.81	$5^- \to 3^-$	189 ± 3 ps	10.0 ± 1.0	[0]	(1.9 ± 0.2)(-1)	
	5.16 → 0	$2^+ \to 0^+$	31 ± 9 fs	9.3 ± 1.9	0	(8 ± 3)(-2)	
	5.35 → 2.17	$4^+ \to 2^+$	200 ± 40 fs	59 ± 3	[0]	(1.0 ± 0.2)(0)	
	→ 3.94	$\to 2^+$		32 ± 2	[0]	(3.0 ± 0.6)(+1)	
	5.59 → 0	$2^+ \to 0^+$	110 ± 30 fs	23 ± 3	0	(4.1 ± 1.2)(-2)	
	→ 3.38	$\to 0^+$		17 ± 3	0	(3.1 ± 1.0)(0)	
	7.07 → 4.59	$5^- \to 5^-$	74 ± 20 fs	100	-0.53 ± 0.06	(3.3 ± 1.1)(0)	
	10.17 → 8.97	$9^- \to 7^-$	6 ± 2 ps	48 ± 2	[0]	(3.3 ± 1.1)(0)	
	11.61 → 10.17	$11^- \to 9^-$	7 ± 3 ps	100	[0]	(2.4 ± 1.0)(0)	
^{38}K	0.46 → 0	$1^+ \to 3^+$	10.1 ± 0.9 ps	0.96 ± 0.10	[0]	(3.2 ± 0.4)(0)	
	2.40 → 0.13	$2^+;1 \to 0^+;1$	72 ± 17 fs	6 ± 2	0	(1.4 ± 0.6)(0)	
^{39}Ar	2.43 → 0	$3/2^- \to 7/2^-$	$1.00 \pm^{0.45}_{0.20}$ ps	23.8 ± 0.9	≈ 0	(3.1 ± 1.0)(-1)	
	2.48 → 0	$7/2^- \to 7/2^-$	500 ± 190 fs	82.5 ± 1.6	+1/(0.14 ± 0.10)	(1.9 ± 0.7)(0)	
^{39}K	2.52 → 0	$1/2^+ \to 3/2^+$	75 ± 20 fs	100	±0.69 ± 0.13	(4.3 ± 1.6)(0)	
	3.60 → 2.81	$9/2^- \to 7/2^-$	55 ± 2 ps	48 ± 2	-0.59 ± 0.02	(7.5 ± 0.6)(-1)	
	3.944 → 2.81	$11/2^- \to 7/2^-$	13.0 ± 1.4 ps	63 ± 1	≈ 0	(2.8 ± 0.3)(0)	
	8.03 → 7.14	$19/2^- \to 15/2^-$	20.0 ± 1.5 ps	89 ± 1	[0]	(8.6 ± 0.6)(0)	
^{40}Ar	1.46 → 0	$2^+ \to 0^+$	1.61 ± 0.06 ps	100	0	(8.9 ± 0.4)(0)	

TABLE V. Strengths of Isospin-Allowed $E2$ Transitions ($E2_{IS}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{40}Ar	2.12 → 1.46	$0^+ \rightarrow 2^+$	130 ± 40 ps	100	0	(6.1 ± 1.9)(0)	
	2.52 → 0	$2^+ \rightarrow 0^+$	300 ± 40 fs	41 ± 2	0	(1.3 ± 0.2)(0)	
	2.89 → 1.46	$4^+ \rightarrow 2^+$	4.3 ± 1.5 ps	100	[0]	(3.8 ± 1.3)(0)	
	3.21 → 0	$2^+ \rightarrow 0^+$	45 ± 10 fs	11 ± 2	0	(7.0 ± 2.0)(-1)	
	3.46 → 2.89	$6^+ \rightarrow 4^+$	980 ± 30 ps	100	[0]	(1.6 ± 0.1)(0)	
	3.51 → 0	$2^+ \rightarrow 0^+$	120 ± 50 fs	11 ± 2	0	(1.7 ± 0.8)(-1)	42
	3.92 → 0	$2^+ \rightarrow 0^+$	440 ± 90 fs	59 ± 3	0	(1.4 ± 0.3)(-1)	
	→ 2.12	$\rightarrow 0^+$		12 ± 1	0	(1.3 ± 0.3)(0)	
^{40}K	0.89 → 0	$5^- \rightarrow 4^-$	1.25 ± 0.20 ps	100	-0.099 ± 0.008	(1.4 ± 0.3)(0)	
	2.05 → 0	$2^- \rightarrow 4^-$	490 ± 60 fs	29 ± 2	[0]	(1.6 ± 0.2)(0)	
	2.07 → 0.89	$3^- \rightarrow 5^-$	680 ± 150 fs	3 ± 1	[0]	(1.8 ± 0.7)(0)	
	2.40 → 0.03	$4^- \rightarrow 3^-$	50 ± 20 fs	71 ± 3	-0.25 ± 0.03	(1.1 ± 0.5)(0)	
	2.42 → 0	$2^- \rightarrow 4^-$	800 ± 200 fs	6 ± 1	≈ 0	(9 ± 2)(-2)	
	→ 0.03	$\rightarrow 3^-$		16 ± 2	+1.4 ± 0.6	(1.6 ± 0.6)(-1)	
^{40}Ca	3.90 → 0	$2^+ \rightarrow 0^+$	49 ± 3 fs	100	0	(2.2 ± 0.2)(0)	
	→ 3.35	$\rightarrow 0^+$		0.081 ± 0.007	0	(2.9 ± 0.3)(+1)	
	4.49 → 3.74	$5^- \rightarrow 3^-$	392 ± 12 ps	100	≈ 0	(9.4 ± 0.3)(-1)	
	5.21 → 3.90	$0^+ \rightarrow 2^+$	1.6 ± 0.3 ps	100	0	(1.6 ± 0.3)(+1)	
	5.25 → 0	$2^+ \rightarrow 0^+$	160 ± 40 fs	81 ± 3	0	(1.0 ± 0.3)(-1)	
	→ 3.35	$\rightarrow 0^+$		2.1 ± 0.1	0	(5.2 ± 1.3)(-1)	
	→ 3.90	$\rightarrow 2^+$		17 ± 3	+13 ± 5	(2.3 ± 0.7)(+1)	
	5.28 → 3.90	$4^+ \rightarrow 2^+$	330 ± 50 fs	96 ± 2	≈ 0	(5.6 ± 0.9)(+1)	
	5.61 → 3.74	$4^- \rightarrow 3^-$	960 ± 150 fs	72 ± 3	+0.27 ± 0.05	(2.2 ± 0.8)(-1)	
	→ 4.49	$\rightarrow 5^-$		28 ± 3	+0.7 ± 0.2	(5 ± 2)(0)	
	5.63 → 0	$2^+ \rightarrow 0^+$	76 ± 21 fs	90 ± 5	0	(1.9 ± 0.5)(-1)	
	6.026 → 3.74	$2^- \rightarrow 3^-$	220 ± 40 fs	77 ± 3	+2.8 ± 0.5	(4.9 ± 0.9)(0)	
	6.029 → 3.90	$3^+ \rightarrow 2^+$	550 ± 100 fs	87 ± 4	>10	(4.1 ± 0.8)(0)	
	→ 5.25	$\rightarrow 2^+$		13 ± 4	>4	(9 ± 3)(+1)	
	6.29 → 4.49	$3^- \rightarrow 5^-$	490 ± 70 fs	74 ± 5	≈ 0	(6.9 ± 1.1)(0)	
	6.51 → 3.90	$4^+ \rightarrow 2^+$	180 ± 35 fs	84 ± 3	≈ 0	(3.8 ± 0.8)(0)	
	→ 5.25	$\rightarrow 2^+$		13 ± 3	[0]	(2.3 ± 0.7)(+1)	
	6.54 → 3.90	$4^+ \rightarrow 2^+$	180 ± 35 fs	72 ± 3	≈ 0	(3.0 ± 0.6)(0)	
	→ 5.25	$\rightarrow 2^+$		9 ± 3	[0]	(1.4 ± 0.5)(+1)	
	→ 5.63	$\rightarrow 2^+$		12 ± 3	[0]	(7 ± 2)(0)	
	6.58 → 3.74	$3^- \rightarrow 3^-$	250 ± 45 fs	65 ± 5	-3.1 ± 1.9	(1.3 ± 0.3)(0)	
	6.75 → 3.74	$2^- \rightarrow 3^-$	150 ± 35 fs	100	+0.84 ± 0.16	(1.1 ± 0.4)(0)	
	6.91 → 0	$2^+ \rightarrow 0^+$	4.1 ± 0.9 fs	100	0	(1.5 ± 0.3)(0)	
	7.30 → 5.25	$0^+ \rightarrow 2^+$	170 ± 50 fs	>80	0	(1.6 ± 0.5)(+1)	
^{41}Ar	0.52 → 0	$3/2^- \rightarrow 7/2^-$	475 ± 30 ps	78 ± 3	[0]	(3.9 ± 0.3)(0)	
^{41}K	0.98 → 0	$1/2^+ \rightarrow 3/2^+$	5.0 ± 1.5 ps	100	±0.53 ± 0.11	(4.6 ± 2.0)(0)	
	1.56 → 0	$3/2^+ \rightarrow 3/2^+$	600 ± 110 fs	82.4 ± 0.6	+0.27 ± 0.02	(1.0 ± 0.2)(0)	
	1.68 → 0	$7/2^+ \rightarrow 3/2^+$	2.3 ± 0.6 ps	100	[0]	(3.1 ± 0.8)(0)	
	1.70 → 0	$5/2^+ \rightarrow 3/2^+$	1.2 ± 0.3 ps	100	+2.1 ± 0.2	(4.6 ± 1.2)(0)	
	2.32 → 1.29	$5/2^- \rightarrow 7/2^-$	780 ± 210 fs	94.0 ± 0.3	+0.08 ± 0.01	(7 ± 3)(-1)	
	2.51 → 0	$7/2^+ \rightarrow 3/2^+$	225 ± 85 fs	48.8 ± 1.5	[0]	(2.1 ± 0.8)(0)	
	→ 1.56	$\rightarrow 3/2^+$		4.6 ± 0.5	[0]	(2.5 ± 1.0)(+1)	
	2.53 → 1.68	$11/2^+ \rightarrow 7/2^+$	216 ± 11 ps	100	[0]	(1.0 ± 0.1)(0)	
	2.762 → 1.29	$11/2^- \rightarrow 7/2^-$	660 ± 170 fs	100	[0]	(2.1 ± 0.5)(+1)	
	4.98 → 4.27	$19/2^- \rightarrow 15/2^-$	108 ± 9 ps	100	[0]	(5.3 ± 0.4)(0)	
^{41}Ca	1.94 → 0	$3/2^- \rightarrow 7/2^-$	570 ± 100 fs	100	[0]	(6.0 ± 1.0)(0)	
	2.96 → 0	$7/2^- \rightarrow 7/2^-$	40 ± 10 fs	100	+0.29 ± 0.01	(8 ± 2)(-1)	
	3.68 → 0	$9/2^- \rightarrow 7/2^-$	65 ± 15 fs	94 ± 1	+1.28 ± 0.02	(1.3 ± 0.3)(0)	
	3.73 → 0	$3/2^- \rightarrow 7/2^-$	75 ± 20 fs	49 ± 1	[0]	(9 ± 2)(-1)	
	3.83 → 3.37	$15/2^+ \rightarrow 11/2^+$	4.5 ± 0.2 ns	100	[0]	(1.0 ± 0.1)(0)	
	4.01 → 0	$11/2^- \rightarrow 7/2^-$	15 ± 6 fs	100	[0]	(6 ± 2)(0)	

TABLE V. Strengths of Isospin-Allowed $E2$ Transitions ($E2_{IS}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{41}Ca	4.34 → 0	$9/2^- \rightarrow 7/2^-$	185 ± 35 fs	100	-7.3 ± 1.1	(3.3 ± 0.7)(-1)	
	4.731 → 0	$3/2^- \rightarrow 7/2^-$	37 ± 12 fs	18 ± 4	[0]	(2.0 ± 0.8)(-1)	
^{41}Sc	5.14 → 0	$3/2^- \rightarrow 7/2^-$	5.0 ± 1.4 meV	100	[0]	(2.0 ± 0.7)(-1)	
	5.54 → 0	$3/2^- \rightarrow 7/2^-$	32 ± 10 meV	100	[0]	(9 ± 3)(-1)	
	5.86 → 0	$3/2^- \rightarrow 7/2^-$	38 ± 11 meV	100	[0]	(8 ± 3)(-1)	
^{42}Ar	1.21 → 0	$2^+ \rightarrow 0^+$	3.8 ± 0.9 ps	100	0	(1.0 ± 0.2)(+1)	
	2.49 → 0	$2^+ \rightarrow 0^+$	400 ± 160 fs	18 ± 4	0	(5 ± 2)(-1)	
^{42}K	0.70 → 0.11	$5^- \rightarrow 3^-$	59 ± 11 ps	3.6 ± 1.0	[0]	(8 ± 3)(-1)	
	→ 0.26	$\rightarrow 4^-$		96.4 ± 1.0	-0.102 ± 0.008	(9 ± 2)(-1)	
	1.376 → 1.14	$6^+ \rightarrow 4^+$	1.6 ± 0.2 ns	10.3 ± 0.7	≈ 0	(8.2 ± 1.0)(0)	
^{42}Ca	1.52 → 0	$2^+ \rightarrow 0^+$	1.19 ± 0.04 ps	100	0	(9.5 ± 0.3)(0)	
	1.84 → 1.52	$0^+ \rightarrow 2^+$	480 ± 30 ps	97.95 ± 0.17	0	(5.0 ± 0.3)(+1)	
	2.42 → 0	$2^+ \rightarrow 0^+$	200 ± 60 fs	30 ± 1	0	(1.7 ± 0.5)(0)	
	→ 1.52	$\rightarrow 2^+$		70 ± 1	+0.18 ± 0.02	(1.8 ± 0.7)(+1)	
	2.75 → 1.52	$4^+ \rightarrow 2^+$	4.4 ± 0.6 ps	99.0 ± 0.4	≈ 0	(1.0 ± 0.1)(+1)	
	→ 2.42	$\rightarrow 2^+$		1.0 ± 0.4	[0]	(7 ± 3)(+1)	
	3.19 → 2.75	$6^+ \rightarrow 4^+$	7.73 ± 0.12 ns	100	[0]	(7.5 ± 0.1)(-1)	
	3.25 → 1.52	$4^+ \rightarrow 2^+$	190 ± 30 fs	55 ± 5	≈ 0	(1.7 ± 0.3)(+1)	
	3.39 → 0	$2^+ \rightarrow 0^+$	190 ± 30 fs	40 ± 2	0	(4.4 ± 0.8)(-1)	
	→ 1.52	$\rightarrow 2^+$		43 ± 4	-1.7 ± 0.4	(6.9 ± 1.5)(0)	
	→ 1.84	$\rightarrow 0^+$		7 ± 1	0	(3.9 ± 0.8)(0)	
	4.896 → 3.45	$5^- \rightarrow 3^-$	72 ± 20 fs	20 ± 5	≈ 0	(3.9 ± 1.5)(+1)	
	5.74 → 4.10	$7^- \rightarrow 5^-$	600 ± 140 fs	54 ± 3	[0]	(6.9 ± 1.6)(0)	
	6.14 → 3.95	$6^- \rightarrow 4^-$	70 ± 25 fs	50 ± 5	[0]	(1.3 ± 0.5)(+1)	
	→ 4.353	$\rightarrow 4^-$		26 ± 6	[0]	(1.9 ± 0.8)(+1)	
	6.41 → 5.49	$8^- \rightarrow 6^-$	45 ± 4 ps	72 ± 2	≈ 0	(2.2 ± 0.2)(0)	
	6.55 → 5.74	$9^- \rightarrow 7^-$	61 ± 4 ps	72 ± 1	≈ 0	(3.1 ± 0.2)(0)	
^{42}Sc	1.59 → 0	$2^+;1 \rightarrow 0^+;1$	100 ± 30 fs	9 ± 2	0	(8 ± 3)(0)	
^{42}Ti	1.55 → 0	$2^+ \rightarrow 0^+$	580 ± 110 fs	100	0	(1.8 ± 0.3)(+1)	
	2.40 → 0	$2^+ \rightarrow 0^+$	330 ± 150 fs	16 ± 3	0	(5 ± 2)(-1)	
	3.04 → 2.68	$6^+ \rightarrow 4^+$	4.5 ± 0.3 ns	100	[0]	(3.1 ± 0.2)(0)	
^{43}Ca	0.37 → 0	$5/2^- \rightarrow 7/2^-$	48 ± 4 ps	100	+0.192 ± 0.011	(9.2 ± 1.2)(0)	
	0.59 → 0	$3/2^- \rightarrow 7/2^-$	117 ± 6 ps	70 ± 2	≈ 0	(7.2 ± 0.4)(0)	
	1.39 → 0.99	$5/2^+ \rightarrow 3/2^+$	3.5 ± 1.1 ps	11.7 ± 0.3	-0.32 ± 0.05	(2.7 ± 1.1)(+1)	
	1.68 → 0	$11/2^- \rightarrow 7/2^-$	1.0 ± 0.2 ps	100	[0]	(6.7 ± 1.3)(0)	
	1.90 → 0.99	$7/2^+ \rightarrow 3/2^+$	800 ± 150 fs	13 ± 4	[0]	(2.3 ± 0.8)(+1)	
	2.41 → 1.39	$9/2^+ \rightarrow 5/2^+$	1.8 ± 0.7 ps	44 ± 4	[0]	(5 ± 2)(+1)	
	2.754 → 1.68	$15/2^- \rightarrow 11/2^-$	34.5 ± 1.4 ps	100	[0]	(1.8 ± 0.7)(+1)	
	3.50 → 2.95	$13/2^+ \rightarrow 11/2^+$	105 ± 35 fs	12 ± 2	+0.06 ± 0.01	(7 ± 3)(0)	
	4.19 → 3.37	$15/2^+ \rightarrow 13/2^+$	180 ± 70 fs	86 ± 3	+0.15 ± 0.02	(2.5 ± 1.2)(+1)	
^{43}Sc	0.47 → 0	$3/2^- \rightarrow 7/2^-$	226 ± 15 ps	96 ± 1	[0]	(1.6 ± 0.1)(+1)	
	0.85 → 0	$5/2^- \rightarrow 7/2^-$	330 ± 110 fs	100	-0.16 ± 0.03	(1.5 ± 0.7)(+1)	
	0.88 → 0.15	$5/2^+ \rightarrow 3/2^+$	6.4 ± 0.9 ps	98 ± 1	+0.52 ± 0.07	(1.4 ± 0.4)(+1)	
	1.16 → 0.15	$3/2^+ \rightarrow 3/2^+$	6.4 ± 1.5 ps	54 ± 5	+1.3 ± 0.4	(4.4 ± 1.5)(0)	
	1.18 → 0	$3/2^- \rightarrow 7/2^-$	700 ± 200 fs	16 ± 2	[0]	(9 ± 3)(0)	
	1.34 → 0.15	$7/2^+ \rightarrow 3/2^+$	1.2 ± 0.5 ps	63 ± 2	[0]	(1.9 ± 0.8)(+1)	
	1.41 → 0.47	$7/2^- \rightarrow 3/2^-$	290 ± 70 fs	4 ± 1	[0]	(1.7 ± 0.6)(+1)	
	1.65 → 0.86	$5/2^+ \rightarrow 1/2^+$	250 ± 40 fs	3 ± 1	[0]	(3.5 ± 1.3)(+1)	
	1.93 → 0.88	$9/2^+ \rightarrow 5/2^+$	3.4 ± 0.8 ps	79 ± 7	[0]	(1.6 ± 0.4)(+1)	
	→ 1.34	$\rightarrow 7/2^+$		21 ± 7	+0.24 ± 0.04	(4.1 ± 2.0)(0)	
^{44}Ca	1.16 → 0	$2^+ \rightarrow 0^+$	4.2 ± 0.3 ps	100	0	(9.8 ± 0.7)(0)	
	1.88 → 1.16	$0^+ \rightarrow 2^+$	20 ± 6 ps	≈ 100	0	(2.2 ± 0.7)(+1)	
	2.28 → 1.16	$4^+ \rightarrow 2^+$	2.8 ± 1.0 ps	100	≈ 0	(1.8 ± 0.6)(+1)	
	3.04 → 1.16	$4^+ \rightarrow 2^+$	6.7 ± 1.6 ps	49 ± 3	≈ 0	(2.7 ± 0.7)(-1)	
^{44}Sc	0.35 → 0	$4^+ \rightarrow 2^+$	4.5 ± 0.2 ns	100	≈ 0	(3.6 ± 0.2)(0)	

TABLE V. Strengths of Isospin-Allowed $E2$ Transitions ($E2_{IS}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{44}Sc	0.42 → 0.07	$3^- \rightarrow 1^-$	550 ± 60 ps	58 ± 2	≈ 0	(1.6 ± 0.2)(+1)	
	0.63 → 0.23	$4^- \rightarrow 2^-$	580 ± 35 ps	43 ± 2	≈ 0	(6.3 ± 0.5)(+0)	
^{44}Ti	1.08 → 0	$2^+ \rightarrow 0^+$	4.5 ± 1.1 ps	100	0	(1.4 ± 0.3)(+1)	
	2.45 → 1.08	$4^+ \rightarrow 2^+$	600 ± 100 fs	100	[0]	(3.0 ± 0.5)(+1)	
	2.53 → 0	$2^+ \rightarrow 0^+$	1.4 ± 0.2 ps	25 ± 5	0	(1.5 ± 0.4)(-1)	
	→ 1.08	$\rightarrow 2^+$		71 ± 5	$+8 \pm {}^{8}_{3}$	(6.7 ± 1.1)(0)	
	→ 1.90	$\rightarrow 0^+$		3.7 ± 0.5	0	(2.2 ± 0.4)(+1)	
	2.89 → 0	$2^+ \rightarrow 0^+$	500 ± 100 fs	59 ± 10	0	(5.1 ± 1.3)(-1)	
	3.36 → 1.08	$4^+ \rightarrow 2^+$	500 ± 100 fs	95 ± 2	[0]	(2.6 ± 0.5)(0)	
	→ 2.53	$\rightarrow 2^+$		5 ± 2	[0]	(2.2 ± 1.0)(+1)	
	3.98 → 1.08	$4^+ \rightarrow 2^+$	500 ± 200 fs	52 ± 8	[0]	(4.2 ± 1.8)(-1)	
	→ 2.89	$\rightarrow 2^+$		25 ± 5	[0]	(2.7 ± 1.2)(+1)	
	4.02 → 2.45	$6^+ \rightarrow 4^+$	560 ± 80 fs	100	[0]	(1.6 ± 0.2)(+1)	
	4.12 → 0	$2^+ \rightarrow 0^+$	160 ± 70 fs	31 ± 5	0	(1.4 ± 0.7)(-1)	

TABLE VI. Strengths of Isospin-Retarded $E2$ Transitions ($E2_{IV}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi; T_i \rightarrow J_f^\pi; T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{8}Be	17.64 → 2.94	$1^+; 1 \rightarrow 2^+$	25.2 eV	34	+0.21 ± 0.04	(8 ± 4)(-1)	
^{9}Be	16.98 → 2.43	$1/2^-; 3/2 \rightarrow 5/2^-$	16 ± 2	2.4 ± 0.2	[0]	(6.3 ± 1.5)(-1)	
^{12}C	16.11 → 0	$2^+; 1 \rightarrow 0^+$		from B(E2)		(2.5 ± 0.3)(-1)	45
^{13}C	15.11 → 0	$3/2^-; 3/2 \rightarrow 1/2^-$		from B(E2)		(5.1 ± 1.0)(-1)	
^{13}N	15.07 → 0	$3/2^-; 3/2 \rightarrow 1/2^-$	44 ± 2	55 ± 3	±0.11 ± 0.02	(2.8 ± 1.1)(-1)	
^{14}N	9.17 → 6.44	$2^+; 1 \rightarrow 3^+$	11.9 eV	8.8 ± 0.8	+0.031 ± 0.006	(5 ± 2)(0)	55
^{17}O, ^{17}F		$1/2_1^+ \rightarrow 5/2_1^+$				(3.0 ± 0.1)(0)	
^{18}O, ^{18}Ne		$2_1^+ \rightarrow 0_1^+$				(1.4 ± 0.2)(0)	
		$4_1^+ \rightarrow 2_1^+$				(8.7 ± 1.9)(-1)	
^{19}F, ^{19}Ne		$5/2_1^+ \rightarrow 1/2_1^+$				(2.9 ± 0.3)(-1)	
^{20}Ne	10.27 → 0	$2^+; 1 \rightarrow 0^+$	4.8 ± 0.3 eV	0.65 ± 0.14	0	(1.0 ± 0.2)(-1)	
^{25}Al	7.90 → 0	$5/2^+; 3/2 \rightarrow 5/2^+$	800 ± 200 meV	50 ± 3	-0.11 ± 0.02	(4.4 ± 1.9)(-2)	
^{25}Mg, ^{25}Al		$1/2_1^+ \rightarrow 5/2_1^+$				(2.5 ± 0.1)(-1)	
^{27}Al, ^{27}Si		$3/2_1^+ \rightarrow 5/2_1^+$				(1.0 ± 0.3)(0)	
^{30}P	3.83 → 0.68	$2^+ \rightarrow 0^+; 1$	55 ± 20 fs	18 ± 6	0	(1.5 ± 0.7)(0)	
^{30}Si, ^{30}S		$2_2^+ \rightarrow 0_1^+$				(7 ± 3)(-2)	
^{34}Cl	6.37 → 0	$2^+ \rightarrow 0^+; 1$	300 ± 120 meV	15	0	(8 ± 3)(-1)	
^{34}S, ^{34}Ar		$2_2^+ \rightarrow 0_1^+$				(3.6 ± 1.7)(-2)	
^{36}Ar	6.61 → 0	$2^+; 1 \rightarrow 0^+$	22 ± 9 fs	17 ± 2	0	(7 ± 3)(-2)	
^{38}K	2.40 → 0.46	$2^+; 1 \rightarrow 1^+$	72 ± 17 fs	94 ± 2	-0.077 ± 0.012	(2.8 ± 1.1)(-1)	
^{42}Ca, ^{42}Ti		$6_1^+ \rightarrow 4_1^+$				(2.0 ± 0.3)(-1)	

TABLE VII. Strengths of $E3$ Transitions

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \to E_{xf}$ (MeV)	$J_i^\pi \to J_f^\pi$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{12}C	9.64 → 0	$3^- \to 0^+$		from B(E3)		(1.4 ± 0.1)(+1)	
^{13}C	3.85 → 0	$5/2^+ \to 1/2^-$	12.7 ± 0.3 ps	63.2 ± 0.7	+0.12 ± 0.03	(1.0 ± 0.5)(+1)	47
^{14}C	6.73 → 0	$3^- \to 0^+$	97 ± 15 fs	96 ± 1	0	(2.4 ± 0.4)(0)	
^{14}N	5.11 → 0	$2^- \to 1^+$		from B(E3)		(4.1 ± 1.0)(0)	
	5.83 → 0	$3^- \to 1^+$	18 ± 2 ps	27	-1.20 ± 0.25	(4.8 ± 0.8)(0)	43
^{15}N	5.27 → 0	$5/2^+ \to 1/2^-$	2.6 ± 0.2 ps	100	-0.130 ± 0.006	(7.2 ± 0.8)(0)	
	7.16 → 0	$5/2^+ \to 1/2^-$		from B(E3)		(1.7 ± 0.2)(0)	
	7.57 → 0	$7/2^+ \to 1/2^-$		from B(E3)		(2.5 ± 0.2)(0)	
^{15}O	7.28 → 0	$7/2^+ \to 1/2^-$	750 ± 200 fs	3.8 ± 1.2	[0]	(6 ± 2)(0)	49
^{16}O	6.13 → 0	$3^- \to 0^+$	26.6 ± 0.7 ps	100	0	(1.3 ± 0.1)(+1)	
^{17}O	3.06 → 0	$1/2^- \to 5/2^+$		from B(E3)		(1.9 ± 0.4)(0)	
	3.84 → 0	$5/2^- \to 5/2^+$		from B(E3)		(3.0 ± 0.1)(0)	
^{18}O	5.10 → 0	$3^- \to 0^+$		from B(E3)	0	(4.7 ± 0.4)(0)	
^{19}F	1.35 → 0	$5/2^- \to 1/2^+$		from B(E3)		(8.9 ± 1.0)(0)	
	5.43 → 0	$7/2^- \to 1/2^+$		from B(E3)		(1.5 ± 0.4)(+1)	
^{20}Ne	5.62 → 0	$3^- \to 0^+$	240 ± 65 μeV	7.6 ± 1.0	0	(1.1 ± 0.3)(+1)	
^{21}Ne	2.79 → 0.35	$1/2^- \to 5/2^+$	117 ± 7 ps	83.2 ± 0.7	-0.12 ± 0.03	(1.2 ± 0.6)(+1)	52
^{24}Mg	7.62 → 0	$3^- \to 0^+$	1.7 ± 0.3 ps	23 ± 2	0	(5.9 ± 1.2)(0)	
	8.36 → 0	$3^- \to 0^+$		from B(E3)	0	(7.9 ± 0.8)(0)	
^{26}Mg	6.88 → 0	$3^- \to 0^+$		from B(E3)	0	(2.7 ± 0.5)(0)	
^{28}Si	6.88 → 0	$3^- \to 0^+$	2.6 ± 0.4 ps	64 ± 2	0	(1.2 ± 0.2)(+1)	
	8.41 → 1.78	$4^- \to 2^+$	430 ± 90 fs	22 ± 2	+2.5 ± 0.2	(2.9 ± 0.7)(+1)	
	9.70 → 1.78	$5^- \to 2^+$	6 ± 2 ps	10 ± 1	[0]	(3.1 ± 1.1)(-1)	
^{29}Si	3.62 → 0	$7/2^- \to 1/2^+$	4.2 ± 0.4 ps	0.34 ± 0.06	[0]	(3.3 ± 0.7)(0)	
^{31}P	4.43 → 0	$7/2^- \to 1/2^+$	600 ± 100 fs	1.0 ± 0.2	[0]	(1.5 ± 0.3)(+1)	
	8.84 → 0	$7/2^- \to 1/2^+$	47 ± 14 meV	1.0	[0]	(5.0 ± 1.7)(0)	
	9.25 → 0	$7/2^- \to 1/2^+$	90 ± 30 meV	1.7	[0]	(1.1 ± 0.4)(+1)	
^{32}S	5.01 → 0	$3^- \to 0^+$	550 ± 100 fs	3.1 ± 0.5	0	(2.0 ± 0.5)(+1)	
^{33}S	2.93 → 0	$7/2^- \to 3/2^+$	41 ± 2 ps	46 ± 2	+0.15 ± 0.02	(3.2 ± 0.9)(0)	
^{35}Cl	3.16 → 0	$7/2^- \to 3/2^+$	41.8 ± 1.1 ps	90 ± 1	-0.16 ± 0.02	(4.0 ± 1.0)(0)	
^{36}Cl	2.52 → 0	$5^- \to 2^+$	2.33 ± 0.11 ns	4.4 ± 0.5	[0]	(6.7 ± 0.7)(-1)	
	→ 0.79	$\to 3^+$	±	95.6 ± 0.5	+0.11 ± 0.01	(2.4 ± 0.5)(0)	
^{36}Ar	4.18 → 0	$3^- \to 0^+$	3.3 ± 0.4 ps	6.5 ± 0.4	0	(2.3 ± 0.3)(+1)	
	5.17 → 1.97	$5^- \to 2^+$	127 ± 5 ps	5.8 ± 0.4	[0]	(3.0 ± 0.2)(0)	
	5.86 → 0	$3^- \to 0^+$	450 ± 150 fs	3.0 ± 1.0	0	(6 ± 3)(0)	
^{37}Cl	3.10 → 0	$7/2^- \to 3/2^+$	22 ± 3 ps	100	-0.18 ± 0.01	(1.1 ± 0.2)(+1)	
	4.011 → 0	$9/2^- \to 3/2^+$	33 ± 2 ps	31 ± 1	≈ 0	(1.2 ± 0.1)(+1)	
^{37}Ar	1.61 → 0	$7/2^- \to 3/2^+$	6.30 ± 0.13 ns	100	+0.12 ± 0.01	(1.7 ± 0.3)(0)	
^{38}Ar	3.81 → 0	$3^- \to 0^+$	80 ± 20 fs	0.072 ± 0.008	0	(1.6 ± 0.4)(+1)	
^{39}Ar	1.52 → 0	$3/2^+ \to 7/2^-$	1.37 ± 0.07 ns	45.9 ± 1.2	-0.20 ± 0.04	(1.3 ± 0.5)(+1)	
^{39}K	2.81 → 0	$7/2^- \to 3/2^+$	68 ± 3 ps	100	-0.17 ± 0.02	(5.5 ± 1.3)(0)	
	3.02 → 0	$3/2^- \to 3/2^+$		from B(E3)		(3.9 ± 0.6)(+1)	
	3.60 → 0	$9/2^- \to 3/2^+$	55 ± 2 ps	52 ± 2	[0]	(2.3 ± 0.1)(+1)	
^{40}Ar	3.68 → 0	$3^- \to 0^+$		from B(E3)	0	(1.2 ± 0.1)(+1)	
^{40}K	1.64 → 0.03	$0^+ \to 3^-$	480 ± 10 ns	84 ± 3	0	(1.1 ± 0.1)(0)	
	2.54 → 0	$7^- \to 4^-$	1.56 ± 0.07 ns	11.2 ± 0.4	[0]	(1.9 ± 0.1)(0)	
^{40}Ca	3.74 → 0	$3^- \to 0^+$	68 ± 3 ps	100	0	(2.6 ± 0.1)(+1)	
	6.29 → 0	$3^- \to 0^+$		from B(E3)	0	(4.6 ± 0.4)(0)	
	6.58 → 0	$3^- \to 0^+$		from B(E3)	0	(2.5 ± 0.2)(0)	
^{41}K	1.29 → 0	$7/2^- \to 3/2^+$	10.4 ± 0.3 ns	100	-0.118 ± 0.012	(3.8 ± 0.8)(0)	
^{41}Ca	2.01 → 0	$3/2^+ \to 7/2^-$	670 ± 70 ps	100	-0.13 ± 0.03	(3.3 ± 1.6)(0)	
	3.37 → 0	$11/2^+ \to 7/2^-$	29 ± 2 ps	43 ± 1	-0.94 ± 0.08	(2.3 ± 0.2)(+1)	
^{42}Ca	6.41 → 3.19	$8^- \to 6^+$	45 ± 4 ps	12 ± 2	-0.8 ± 0.2	(4.7 ± 1.7)(0)	

TABLE VIII. Strengths of $E4$ Transitions

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi \rightarrow J_f^\pi$	τ_m	Branching (%)	δ	S (W.u.)	References and Remarks
^{16}O	10.35 → 0	$4^+ \rightarrow 0^+$		from B(E4)		(6 ± 2)(0)	
^{19}F	2.78 → 0	$9/2^+ \rightarrow 1/2^+$		from B(E4)		(5.8 ± 1.3)(0)	
^{20}Ne	4.25 → 0	$4^+ \rightarrow 0^+$		from B(E4)		(2.3 ± 0.5)(+1)	
^{24}Mg	4.12 → 0	$4^+ \rightarrow 0^+$		from B(E4)		(1.2 ± 0.2)(0)	58
	6.01 → 0	$4^+ \rightarrow 0^+$		from B(E4)		(1.5 ± 0.4)(+1)	
^{25}Mg	4.06 → 0	$9/2^+ \rightarrow 5/2^+$		from B(E4)		(2.4 ± 0.6)(0)	
^{26}Mg	4.90 → 0	$4^+ \rightarrow 0^+$		from B(E4)		(1.1 ± 0.2)(+1)	
	5.72 → 0	$4^+ \rightarrow 0^+$		from B(E4)		(5.1 ± 1.8)(0)	
^{28}Si	4.62 → 0	$4^+ \rightarrow 0^+$		from B(E4)		(4.4 ± 0.5)(0)	
^{44}Sc	0.27 → 0	$6^+ \rightarrow 2^+$	84.6 ± 0.2 h	98.80 ± 0.07	[0]	(1.1 ± 0.1)(0)	α = 0.15

TABLE IX. Strengths of $E5$ Transitions, both from $B(E5)$

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi \rightarrow J_f^\pi$	S (W.u.)
^{19}F	4.03 → 0	$9/2^- \rightarrow 1/2^+$	(1.6 ± 0.7)(+1)
^{40}Ca	4.49 → 0	$5^- \rightarrow 0^+$	(1.5 ± 0.3)(+1)

TABLE X. Strengths of Isospin-Allowed $M1$ Transitions ($M1_{IV}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{6}Li	3.56 → 0	$0^+;1 \rightarrow 1^+$		from B(M1)	0	(8.6 ± 0.2)(0)	
^{7}Li	0.48 → 0	$1/2^- \rightarrow 3/2^-$	105 ± 5 fs	100	≈ 0	(2.7 ± 0.2)(0)	
^{7}Be	0.43 → 0	$1/2^- \rightarrow 3/2^-$	192 ± 20 fs	100	[0]	(2.0 ± 0.2)(0)	
^{8}Li	0.98 → 0	$1^+ \rightarrow 2^+$	12 ± 4 fs	100	[0]	(2.8 ± 0.9)(0)	
	2.26 → 0	$3^+ \rightarrow 2^+$	70 ± 30 meV	100	[0]	(2.9 ± 1.3)(-1)	
^{8}Be	17.64 → 0	$1^+;1 \rightarrow 0^+$	25.2 eV	66	0	(1.6 ± 0.5)(-1)	
	→ 2.94	$\rightarrow 2^+$		34	+0.21 ± 0.04	(1.2 ± 0.4)(-1)	
	27.49 → 17.64	$0^+;2 \rightarrow 1^+;1$	23 ± 4 eV	100	0	(1.1 ± 0.2)(0)	
^{9}Be	2.43 → 0	$5/2^- \rightarrow 3/2^-$		from B(M1)		(4.0 ± 0.3)(-1)	
	14.39 → 0	$3/2^-;3/2 \rightarrow 3/2^-$	17 ± 2 eV	from B(M1)		(1.1 ± 0.1)(-1)	
	→ 2.43	$\rightarrow 5/2^-$		46 ± 4	[0]	(2.2 ± 0.3)(-1)	61
	16.98 → 0	$1/2^-;3/2 \rightarrow 3/2^-$	16 ± 2 eV	from B(M1)		(1.1 ± 0.1)(-1)	
	→ 2.78	$\rightarrow 1/2^-$		9 ± 3	0	(2.5 ± 0.8)(-2)	
^{10}B	2.15 → 1.74	$1^+ \rightarrow 0^+;1$	2.13 ± 0.18 ps	51.6 ± 1.6	0	(1.1 ± 0.1)(-1)	
	5.16 → 0	$2^+;1 \rightarrow 3^+$	2.9 ± 1.1 eV	5 ± 1	[0]	(5 ± 2)(-2)	
	→ 0.72	$\rightarrow 1^+$		22 ± 3	[0]	(3.5 ± 1.4)(-1)	
	→ 2.16	$\rightarrow 1^+$		64 ± 5	[0]	(3.3 ± 1.3)(0)	
	→ 3.59	$\rightarrow 2^+$		9 ± 2	[0]	(3.2 ± 1.4)(0)	
^{11}B	2.12 → 0	$1/2^- \rightarrow 3/2^-$	4.8 ± 0.4 fs	100	[0]	(6.9 ± 0.6)(-1)	
	4.45 → 0	$5/2^- \rightarrow 3/2^-$	1.08 ± 0.05 fs	100	-0.19 ± 0.03	(2.7 ± 0.2)(-1)	
	5.02 → 0	$3/2^- \rightarrow 3/2^-$	250 ± 30 as	87 ± 2	≈ 0	(8.8 ± 1.0)(-1)	
	→ 2.12	$\rightarrow 1/2^-$		13 ± 2	≈ 0	(6.7 ± 1.3)(-1)	
	8.56 → 0	$(1/2\text{-}5/2)^- \rightarrow 3/2^-$	1.7 ± 0.1 eV	56 ± 2	from B(M1)	(5.7 ± 0.6)(-2)	
	→ 5.02	$\rightarrow 3/2^-$		9 ± 2	[0]	(1.6 ± 0.4)(-1)	
	8.92 → 0	$5/2^- \rightarrow 3/2^-$		from B(M1)		(3.1 ± 0.3)(-1)	
^{12}B	0.95 → 0	$2^+ \rightarrow 1^+$	260 ± 40 fs	100	≈ 0	(1.4 ± 0.2)(-1)	
^{12}C	15.11 → 0	$1^+;1 \rightarrow 0^+$	41 ± 1 eV	92 ± 2	0	(5.3 ± 0.2)(-1)	
	→ 7.66	$\rightarrow 0^+$		2.6 ± 0.7	0	(1.2 ± 0.3)(-1)	
	→ 12.71	$\rightarrow 1^+$		1.4 ± 0.4	[0]	(2.0 ± 0.6)(0)	
	16.11 → 4.44	$2^+;1 \rightarrow 2^+$	12 ± 2 eV	94 ± 1	[0]	(3.4 ± 0.6)(-1)	32
	→ 12.71	$\rightarrow 1^+$		1.4 ± 0.3	[0]	(1.8 ± 0.5)(-1)	32
^{13}C	3.68 → 0	$3/2^- \rightarrow 1/2^-$	1.59 ± 0.13 fs	98.9 ± 0.5	-0.10 ± 0.02	(3.7 ± 0.3)(-1)	
	8.86 → 0	$1/2^- \rightarrow 1/2^-$		from B(M1)		(2.4 ± 0.4)(-1)	
	9.90 → 0	$3/2^- \rightarrow 1/2^-$		from B(M1)		(1.6 ± 0.2)(-2)	
	15.11 → 0	$3/2^-;3/2 \rightarrow 1/2^-$	46 ± 3 eV	50 ± 5	±0.16 ± 0.02	(3.2 ± 0.4)(-1)	
	→ 3.68	$\rightarrow 3/2^-$		40 ± 5	[0]	(5.9 ± 0.8)(-1)	
^{13}N	3.51 → 0	$3/2^- \rightarrow 1/2^-$	660 meV	92 ± 1	[0]	(7 ± 2)(-1)	
	15.07 → 0	$3/2^-;3/2 \rightarrow 1/2^-$	44 ± 2 eV	55 ± 3	±0.11 ± 0.02	(3.4 ± 0.2)(-1)	
	→ 3.51	$\rightarrow 3/2^-$		45 ± 3	[0]	(6.1 ± 0.4)(-1)	
^{14}C	6.90 → 6.09	$0^- \rightarrow 1^-$	36 ± 4 fs	100	0	(1.6 ± 0.2)(0)	
	7.34 → 6.09	$2^- \rightarrow 1^-$	160 ± 60 fs	50 ± 3	≈ 0	(5.1 ± 1.9)(-2)	46
	→ 6.73	$\rightarrow 3^-$		34 ± 3	≈ 0	(2.9 ± 1.1)(-1)	46
	11.31 → 0	$1^+ \rightarrow 0^+$		from B(M1)	0	(1.2 ± 0.4)(-1)	39
^{14}N	2.31 → 0	$0^+;1 \rightarrow 1^+$	87 ± 6 fs	100	0	(2.9 ± 0.2)(-2)	
	3.95 → 2.31	$1^+ \rightarrow 0^+;1$	8.5 ± 0.8 fs	96.1 ± 0.2	0	(8.1 ± 0.8)(-1)	
	6.20 → 2.31	$1^+ \rightarrow 0^+;1$	124 ± 15 fs	77	0	(3.3 ± 0.4)(-3)	43
	8.06 → 4.92	$1^-;1 \rightarrow 0^-$	12.3 eV	2.2	0	(4.1 ± 1.4)(-1)	43
	→ 5.11	$\rightarrow 2^-$		0.6	[0]	(1.4 ± 0.5)(-1)	43
	→ 5.69	$\rightarrow 1^-$		4.3	[0]	(1.9 ± 0.6)(-1)	43
	8.62 → 0	$0^+;1 \rightarrow 1^+$	5.2 eV	16	0	(6 ± 2)(-2)	43
	→ 3.95	$\rightarrow 1^+$		28	0	(7 ± 2)(-1)	43
	→ 6.20	$\rightarrow 1^+$		44	0	(8 ± 3)(0)	43
	8.91 → 5.83	$3^-;1 \rightarrow 3^-$	410 meV	82	[0]	(5.5 ± 1.8)(-1)	43
	→ 7.97	$\rightarrow 2^-$		0.1	[0]	(2.4 ± 0.8)(-2)	43
	9.17 → 0	$2^+;1 \rightarrow 1^+$	11.9 eV	85.1 ± 1.0	≈ 0	(7 ± 2)(-1)	55

TABLE X. Strengths of Isospin-Allowed $M1$ Transitions ($M1_{IV}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \to E_{xf}$ (MeV)	$J_i^\pi;T_i \to J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{14}N	9.17 → 6.44	$2^+;1 \to 3^+$	11.9 eV	8.8 ± 0.8	≈ 0	(2.4 ± 0.8)(0)	55
	→ 7.03	$\to 2^+$	eV	3.2 ± 0.3	≈ 0	(1.9 ± 0.6)(0)	55
	9.51 → 5.11	$2^-;1 \to 2^-$	4.9 ev	78 ± 3	[0]	(2.1 ± 0.7)(0)	
	→ 5.83	$\to 3^-$		16 ± 2	[0]	(7 ± 2)(-1)	
	10.43 → 0	$2^+;1 \to 1^+$	12.4 ± 1.5 eV	80	[0]	(4.3 ± 0.5)(-1)	43
	→ 6.44	$\to 3^+$		5.9	[0]	(5.6 ± 0.7)(-1)	43
	→ 7.03	$\to 2^+$		7.9	[0]	(1.2 ± 0.2)(0)	43
^{15}N	7.16 → 5.27	$5/2^+ \to 5/2^+$	28 ± 8 fs	≈ 100	≈ 0	(1.7 ± 0.5)(-1)	
	7.30 → 5.27	$3/2^+ \to 5/2^+$	250 ± 100 as	0.6 ± 0.1	≈ 0	(9 ± 4)(-2)	
	7.57 → 5.27	$7/2^+ \to 5/2^+$	60 ± 20 fs	≈ 100	≈ 0	(3.3 ± 1.1)(-2)	
	10.70 → 0	$3/2^- \to 1/2^-$	370 ± 70 meV	52.6 ± 0.8	+0.180 ± 0.004	(7.4 ± 1.4)(-3)	
	→ 6.32	$\to 3/2^-$		3.8 ± 0.1	+0.135 ± 0.015	(7.7 ± 1.5)(-3)	
	→ 9.23	$\to 1/2^-$		1.5 ± 0.1	+0.049 ± 0.006	(8.4 ± 1.6)(-2)	
	11.29 → 0	$1/2^- \to 1/2^-$	290 meV	100	0	(1.0 ± 0.3)(-2)	
	11.62 → 5.30	$1/2^+;3/2 \to 1/2^+$	54 ± 20 eV	7.4 ± 1.5	0	(8 ± 3)(-1)	
	12.52 → 5.27	$5/2^+;3/2 \to 5/2^+$	4.6 ± 0.7 eV	94.2 ± 0.6	-0.02 ± 0.04	(5.4 ± 0.8)(-1)	
^{15}O	6.86 → 5.24	$5/2^+ \to 5/2^+$	16.0 ± 25 fs	100	≈ 0	(4.6 ± 0.7)(-1)	49
	7.56 → 5.18	$1/2^+ \to 1/2^+$	42 meV	15.8 ± 0.6	0	(2.3 ± 0.8)(-2)	
	→ 6.79	$\to 3/2^+$		23.3 ± 0.6	[0]	(1.0 ± 0.3)(0)	
	8.28 → 5.24	$3/2^+ \to 5/2^+$	1.43 eV	42.7 ± 0.5	[0]	(1.0 ± 0.3)(0)	
	→ 6.86	$\to 5/2^+$		1.2 ± 0.3	[0]	(2.9 ± 1.0)(-1)	
	8.74 → 5.18	$1/2^+ \to 1/2^+$	480 meV	67	0	(3.4 ± 1.1)(-1)	
	10.94 → 5.18	$1/2^+;(3/2) \to 1/2^+$	32 ± 5 eV	34 ± 3	0	(2.7 ± 0.5)(0)	
	11.03 → 0	$1/2^- \to 1/2^-$	1.4 ± 0.4 eV	100	0	(5.0 ± 1.4)(-2)	
^{16}N	0.30 → 0	$3^- \to 2^-$	89 ± 12 ps	100	≈ 0	(1.4 ± 0.2)(-2)	
	0.40 → 0	$1^- \to 2^-$	5.5 ± 0.6 ps	26.3 ± 0.6	≈ 0	(2.5 ± 0.3)(-2)	47
	→ 0.12	$\to 0^-$		73.4 ± 0.6	0	(2.0 ± 0.2)(-1)	47
^{16}O	12.80 → 7.12	$0^-;1 \to 1^-$	2.5 ± 0.2 eV	≈ 100	0	(6.5 ± 0.6)(-1)	
	12.97 → 6.13	$2^+;1 \to 3^-$	3.6 ± 0.3 eV	63 ± 6	[0]	(3.4 ± 0.3)(-1)	
	→ 7.12	$\to 1^-$		12 ± 3	[0]	(1.0 ± 0.3)(-1)	
	→ 8.87	$\to 2^-$		25 ± 3	[0]	(6.2 ± 0.7)(-1)	
	13.09 → 7.12	$1^-;1 \to 1^-$	45 ± 8 eV	3.1 ± 0.8	[0]	(3.2 ± 1.0)(-1)	
	13.26 → 6.13	$3^-;1 \to 3^-$	9.2 ± 1.5 eV	> 85	[0]	(1.9 ± 0.3)(0)	
^{17}N	1.37 → 0	$3/2^- \to 1/2^-$	93 ± 35 fs	100	≈ 0	(1.3 ± 0.5)(-1)	
	1.91 → 1.37	$5/2^- \to 3/2^-$	11 ± 2 ps	26 ± 4	≈ 0	(4.7 ± 1.1)(-3)	
	3.13 → 1.91	$7/2^- \to 5/2^-$	275 ± 80 fs	100	≈ 0	(6.3 ± 1.8)(-2)	53
	3.63 → 3.13	$(7/2,9/2)^- \to 7/2^-$	12 ± 2 ps	53 ± 10	[0]	(1.1 ± 0.2)(-2)	53
	3 91 → 1.91	$(3/2,5/2)^- \to 5/2^-$	52 ± 22 fs	100	[0]	(7 ± 3)(-2)	53
^{18}O	3.92 → 1.98	$2^+ \to 2^+$	24 ± 10 fs	85 ± 2	+0.14 ± 0.04	(1.5 ± 0.6)(-1)	
	5.26 → 1.98	$2^+ \to 2^+$	120 ± 30 fs	68 ± 2	+0.15 ± 0.04	(5.0 ± 1.3)(-3)	
	6.20 → 4.46	$1^- \to 1^-$	3.2 ± 0.6 fs	6 ± 2	[0]	(1.1 ± 0.4)(-1)	
	7.12 → 3.56	$4^+ \to 4^+$	80 meV	68.5 ± 1.5	≈ 0	(5.8 ± 1.9)(-2)	
^{18}F	1.70 → 1.04	$1^+ \to 0^+;1$	1.09 ± 0.10 ps	70.2 ± 1.3	0	(7.0 ± 0.6)(-2)	
	3.84 → 3.06	$2^+ \to 2^+;1$	29 ± 9 fs	50 ± 3	-0.1 ± 0.3	(1.1 ± 0.3)(0)	
	4.12 → 3.06	$3^+ \to 2^+;1$	91 ± 22 fs	95 ± 3	≈ 0	(2.8 ± 0.7)(-1)	
	4.36 → 3.06	$1^+ \to 2^+;1$	27 ± 10 fs	100	[0]	(5.3 ± 2.0)(-1)	40
	5.30 → 4.65	$4^+ \to 4^+;1$	11 ± 4 meV	1.3 ± 0.3	[0]	(2.5 ± 1.1)(-2)	
	6.24 → 2.10	$3^-;1 \to 2^-$	1.5 ± 0.3 eV	71 ± 3	[0]	(7.0 ± 1.4)(-1)	
	→ 3.79	$\to 3^-$		11.4 ± 0.6	[0]	(5.5 ± 1.1)(-1)	
	→ 4.23	$\to 2^-$		7.8 ± 0.5	[0]	(6.8 ± 1.4)(-1)	
	→ 4.40	$\to 4^-$		2.7 ± 0.3	[0]	(3.2 ± 0.7)(-1)	
^{18}Ne	3.62 → 1.89	$2^+ \to 2^+$	63 ± 25 fs	91 ± 2	≈ 0	(9 ± 3)(-2)	
^{19}O	0.10 → 0	$3/2^+ \to 5/2^+$	2.00 ± 0.07 ns	100	[0]	(1.7 ± 0.1)(-2)	
^{19}F	1.46 → 0.11	$3/2^- \to 1/2^-$	75 ± 13 fs	68.8 ± 0.7	+0.36 ± 0.07	(1.0 ± 0.2)(-1)	
	1.55 → 0	$3/2^+ \to 1/2^+$	3.5 ± 1.3 fs	2.3 ± 0.4	±0.19 ± 0.04	(5 ± 2)(-2)	

TABLE X. Strengths of Isospin-Allowed $M1$ Transitions ($M1_{IV}$)

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Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{19}F	1.55 → 0.20	$3/2^+ \rightarrow 5/2^+$	3.5 ± 1.3 fs	92.8 ± 0.6	[0]	(3.4 ± 1.3)(0)	
	4.68 → 1.35	$5/2^- \rightarrow 5/2^-$	41 ± 8 meV	63 ± 3	-0.22 ± 0.19	(3.3 ± 0.7)(-2)	
	6.28 → 1.55	$5/2^+ \rightarrow 3/2^+$	330 ± 70 meV	20 ± 2	+0.11 ± 0.06	(3.0 ± 1.1)(-2)	
	6.33 → 0.20	$7/2^+ \rightarrow 5/2^+$	190 ± 40 meV	56 ± 3	-0.27 ± 0.24	(2.1 ± 0.4)(-2)	
	→ 4.38	$\rightarrow 7/2^+$		18 ± 2	+0.04 ± 0.20	(2.1 ± 0.5)(-1)	
	6.79 → 0.11	$3/2^- \rightarrow 1/2^-$	5.5 ± 0.8 eV	39 ± 2	+0.11 ± 0.02	(3.4 ± 0.5)(-1)	
	→ 1.46	$\rightarrow 3/2^-$		25 ± 2	-0.13 ± 0.08	(4.3 ± 0.7)(-1)	
	6.84 → 0.20	$5/2^+ \rightarrow 5/2^+$	330 ± 70 meV	27 ± 6	-0.5 ± 0.5	(1.2 ± 0.6)(-2)	
	6.93 → 1.35	$7/2^- \rightarrow 5/2^-$	1.9 ± 0.4 eV	22 ± 2	+0.01 ± 0.02	(1.0 ± 0.2)(-1)	
	7.54 → 0.20	$5/2^+;3/2 \rightarrow 5/2^+$	5.8 ± 0.7 eV	29 ± 3	+0.09 ± 0.04	(2.0 ± 0.3)(-1)	
	→ 1.55	$\rightarrow 3/2^+$		41 ± 3	+0.017 ± 0.015	(5.3 ± 0.7)(-1)	
	→ 4.38	$\rightarrow 7/2^+$		27 ± 3	+0.04 ± 0.03	(2.3 ± 0.4)(0)	
	7.66 → 0	$3/2^+;3/2 \rightarrow 1/2^+$	5.3 ± 1.5 eV	38 ± 4	+0.06 ± 0.02	(2.1 ± 0.7)(-1)	
	→ 1.55	$\rightarrow 3/2^+$		36 ± 2	+0.06 ± 0.04	(4.0 ± 1.3)(-1)	
	→ 4.55	$\rightarrow 5/2^+$		5.1 ± 0.3	-0.11 ± 0.13	(4.3 ± 1.4)(-1)	
^{19}Ne	1.54 → 0.24	$3/2^+ \rightarrow 5/2^+$	28 ± 11 fs	95 ± 3	[0]	(4.8 ± 1.9)(-1)	
	1.62 → 0.28	$3/2^- \rightarrow 1/2^-$	145 ± 30 fs	70 ± 4	[0]	(6.3 ± 0.7)(-2)	
^{20}F	0.66 → 0	$3^+ \rightarrow 2^+$	390 ± 30 fs	100	≈ 0	(2.6 ± 0.2)(-1)	
	0.82 → 0.66	$4^+ \rightarrow 3^+$	79 ± 6 ps	59 ± 4	[0]	(5.2 ± 0.6)(-2)	
	1.06 → 0	$1^+ \rightarrow 2^+$	45 ± 13 fs	100	[0]	(6.0 ± 1.7)(-1)	
	2.04 → 0.66	$2^+ \rightarrow 3^+$	37 ± 16 fs	92 ± 4	≈ 0	(3.0 ± 1.3)(-1)	
^{20}Ne	10.27 → 1.63	$2^+;1 \rightarrow 2^+$	4.8 ± 0.3 eV	88.9 ± 0.5	≈ 0	(3.3 ± 0.2)(-1)	
	→ 7.42	$\rightarrow 2^+$		6.9 ± 0.4	[0]	(6.8 ± 0.5)(-1)	
	→ 7.83	$\rightarrow 2^+$		0.22 ± 0.06	[0]	(3.4 ± 0.9)(-2)	
	11.23 → 0	$1^+;1 \rightarrow 0^+$		from B(M1)	0	(2.9 ± 0.5)(-1)	
^{21}Ne	0.35 → 0	$5/2^+ \rightarrow 3/2^+$	10.23 ± 0.20 ps	100	≈ 0	(7.1 ± 0.2)(-2)	
	1.75 → 0.35	$7/2^+ \rightarrow 5/2^+$	79 ± 5 fs	95 ± 1	+0.14 ± 0.02	(1.3 ± 0.2)(-1)	59
	2.80 → 0	$1/2^+ \rightarrow 3/2^+$	6.2 ± 1.0 fs	100	[0]	(2.3 ± 1.1)(-1)	59
	2.87 → 1.75	$9/2^+ \rightarrow 7/2^+$	63 ± 5 fs	62 ± 2	≈ 0	(2.2 ± 0.2)(-1)	59
	3.66 → 2.79	$3/2^- \rightarrow 1/2^-$	110 ± 20 fs	37 ± 2	≈ 0	(2.0 ± 0.4)(-1)	
	4.43 → 2.87	$11/2^+ \rightarrow 9/2^+$	50 ± 20 fs	67 ± 12	≈ 0	(1.5 ± 0.4)(-1)	
^{21}Na	0.33 → 0	$5/2^+ \rightarrow 3/2^+$	10.22 ± 0.12 ps	100	≈ 0	(8.4 ± 0.1)(-2)	
	2.42 → 0	$1/2^+ \rightarrow 3/2^+$	2.9 ± 0.8 fs	100	[0]	(7 ± 2)(-1)	
	3.54 → 0	$5/2^+ \rightarrow 3/2^+$	380 ± 20 meV	92 ± 1	≈ 0	(3.8 ± 0.2)(-1)	
	3.68 → 2.80	$3/2^- \rightarrow 1/2^-$	18 ± 5 meV	23 ± 2	[0]	(2.9 ± 0.8)(-1)	
	4.29 → 0	$5/2^+ \rightarrow 3/2^+$	800 ± 230 meV	34 ± 2	-0.20 ± 0.05	(1.5 ± 0.4)(-1)	
	→ 0.33	$\rightarrow 5/2^+$		65 ± 2	≈ 0	(4.0 ± 1.2)(-1)	
	3.22 → 0	$1/2^+;3/2 \rightarrow 3/2^+$	9.1 ± 1.8 eV	100	[0]	(5.5 ± 1.1)(-1)	
^{22}Ne	5.34 → 0	$1^+ \rightarrow 0^+$		from B(M1)	0	(8.0 ± 1.4)(-2)	
	5.52 → 3.36	$4^+ \rightarrow 4^+$	27 ± 4 fs	98.4 ± 0.3	≈ 0	(1.1 ± 0.2)(-1)	34
	6.85 → 0	$1^+ \rightarrow 0^+$		from B(M1)	0	(1.8 ± 0.3)(-1)	
^{22}Na	0.66 → 0.58	$0^+;1 \rightarrow 1^+$	20 ± 3 ps	100	0	(3.9 ± 0.6)(0)	
	1.95 → 0.58	$2^+;1 \rightarrow 1^+$	11 ± 3 fs	100	≈ 0	(1.1 ± 0.3)(0)	38
	2.97 → 1.95	$3^+ \rightarrow 2^+;1$	60 ± 13 fs	100	≈ 0	(6.5 ± 1.5)(-2)	
	3.06 → 1.95	$2^+ \rightarrow 2^+;1$	40 ± 10 fs	85 ± 1	≈ 0	(4.8 ± 1.2)(-1)	
	4.32 → 0.66	$1^+ \rightarrow 0^+;1$	43 ± 12 fs	100	0	(1.7 ± 0.4)(-2)	
	4.36 → 1.95	$2^+ \rightarrow 2^+;1$	11 ± 5 fs	76 ± 4	≈ 0	(1.6 ± 0.7)(-1)	38
	4.71 → 4.07	$5^+ \rightarrow 4^+;1$	60 ± 20 fs	43 ± 3	≈ 0	(8 ± 3)(-1)	
	4.77 → 1.95	$3^+ \rightarrow 2^+;1$	9 ± 2 fs	100	≈ 0	(1.6 ± 0.3)(-1)	38
	5.10 → 4.07	$4^+ \rightarrow 4^+;1$	55 ± 17 fs	37 ± 3	≈ 0	(1.9 ± 0.6)(-1)	
	7.47 → 0	$2^+;1 \rightarrow 3^+$	10 ± 3 eV	78 ± 3	[0]	(9 ± 3)(-1)	
	→ 1.94	$\rightarrow 1^+$		10 ± 2	[0]	(2.8 ± 1.0)(-1)	
	→ 3.06	$\rightarrow 2^+$		4 ± 1	[0]	(2.2 ± 0.9)(-1)	
	→ 4.36	$\rightarrow 2^+$		2.0 ± 0.5	[0]	(3.2 ± 1.3)(-1)	
	→ 4.77	$\rightarrow 3^+$		2.0 ± 0.5	[0]	(4.9 ± 1.9)(-1)	

TABLE X. Strengths of Isospin-Allowed $M1$ Transitions ($M1_{IV}$)

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Nucleus	$E_{xi} \to E_{xf}$ (MeV)	$J_i^\pi;T_i \to J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{23}Na	0.44 → 0	$5/2^+ \to 3/2^+$	1.60 ± 0.09 ps	100	≈ 0	(2.3 ± 0.1)(-1)	
	2.08 → 0.44	$7/2^+ \to 5/2^+$	40 ± 4 fs	91 ± 1	-0.19 ± 0.02	(1.5 ± 0.2)(-1)	
	2.70 → 2.08	$9/2^+ \to 7/2^+$	110 ± 15 fs	36 ± 1	≈ 0	(4.4 ± 0.7)(-1)	
	2.98 → 0	$3/2^+ \to 3/2^+$	5.0 ± 1.0 fs	58 ± 1	≈ 0	(1.4 ± 0.3)(-1)	
	→ 0.44	$\to 5/2^+$		42 ± 1	≈ 0	(1.6 ± 0.3)(-1)	
	3.68 → 2.64	$3/2^- \to 1/2^-$	32 ± 5 fs	17 ± 1	+0.13 ± 0.05	(1.4 ± 0.2)(-1)	
	3.91 → 0	$5/2^+ \to 3/2^+$	11 ± 2 fs	82 ± 2	-0.22 ± 0.03	(3.6 ± 0.6)(-2)	
	→ 2.08	$\to 7/2^+$		8 ± 1	-0.12 ± 0.12	(3.6 ± 0.9)(-2)	
	→ 2.98	$\to 3/2^+$		3 ± 1	[0]	(1.1 ± 0.4)(-1)	
	4.43 → 0	$1/2^+ \to 3/2^+$	270 ± 30 as	94 ± 2	[0]	(1.3 ± 0.3)(0)	
	→ 2.39	$\to 1/2^+$		6 ± 2	0	(8 ± 3)(-1)	
	5.38 → 2.08	$5/2^+ \to 7/2^+$	360 ± 60 as	27 ± 3	[0]	(6.4 ± 1.3)(-1)	
	8.66 → 0	$1/2^+;3/2 \to 3/2^+$	140 ± 30 as	84 ± 2	[0]	(2.9 ± 0.6)(-1)	
	9.61 → 0.44	$3/2^+ \to 5/2^+$	3 ± 1 eV	44	≈ 0	(8 ± 3)(-2)	
	9.654 → 4.43	$1/2^+ \to 1/2^+$	900 meV	1.2	0	(3.6 ± 1.2)(-3)	
	9.70 → 0.44	$3/2^+ \to 5/2^+$	2.5 ± 0.8 eV	30	≈ 0	(4.5 ± 1.5)(-2)	
	9.85 → 2.39	$1/2^+ \to 1/2^+$	1.6 ± 0.4 eV	33	0	(6.1 ± 1.5)(-2)	
	→ 4.43	$\to 1/2^+$		3.5	0	(1.7 ± 0.4)(-2)	
	10.00 → 2.64	$1/2^- \to 1/2^-$	500 ± 150 meV	47	0	(2.9 ± 0.9)(-2)	
	10.01 → 0	$5/2^+ \to 3/2^+$	1.6 ± 0.5 eV	1.5	-2.0 ± 0.2	(2.3 ± 0.8)(-4)	
	→ 0.44	$\to 5/2^+$		16	-0.20 ± 0.02	(1.4 ± 0.4)(-2)	
	→ 2.08	$\to 7/2^+$		4.8	-0.30 ± 0.03	(7 ± 2)(-3)	
	→ 2.98	$\to 3/2^+$		33	≈ 0	(7 ± 2)(-2)	
	→ 3.91	$\to 5/2^+$		20	≈ 0	(7 ± 2)(-2)	
	10.08 → 2.39	$1/2^+ \to 1/2^+$	350 ± 110 meV	4.7	0	(1.7 ± 0.5)(-3)	
	→ 4.43	$\to 1/2^+$		3.2	0	(2.9 ± 0.9)(-3)	
	→ 6.31	$\to 1/2^+$		26	0	(8 ± 3)(-2)	
	10.11 → 2.39	$1/2^+ \to 1/2^+$	300 ± 90 meV	1.6	0	(5.0 ± 1.5)(-4)	
	10.24 → 2.39	$1/2^+ \to 1/2^+$	500 ± 150 meV	17	0	(8 ± 3)(-3)	
	10.33 → 2.64	$1/2^- \to 1/2^-$	450 ± 140 meV	5.9	0	(2.8 ± 0.9)(-3)	
	10.51 → 2.39	$1/2^+ \to 1/2^+$	250 ± 75 meV	10	0	(2.2 ± 0.7)(-3)	
	→ 4.43	$\to 1/2^+$		9.0	0	(4.8 ± 1.6)(-3)	
	→ 6.31	$\to 1/2^+$		1.8	0	(2.9 ± 0.9)(-3)	
^{23}Mg	0.45 → 0	$5/2^+ \to 3/2^+$	1.80 ± 0.20 ps	100	≈ 0	(2.1 ± 0.2)(-1)	
	2.05 → 0.45	$7/2^+ \to 5/2^+$	80 ± 20 fs	84 ± 2	+0.19 ± 0.02	(6.7 ± 1.7)(-2)	
	2.72 → 2.05	$9/2^+(5/2^+) \to 7/2^+$	140 ± 30 fs	32 ± 2	[0]	(2.4 ± 0.5)(-1)	
^{24}Na	0.56 → 0.47	$2^+ \to 1^+$	52 ± 8 ps	97.5 ± 0.5	[0]	(7.7 ± 1.2)(-1)	
	1.51 → 0	$(3,5)^+ \to 4^+$	39 ± 7 fs	100	[0]	(2.3 ± 0.4)(-1)	
	1.85 → 0.47	$2^+ \to 1^+$	260 ± 35 fs	28 ± 1	-0.18 ± 0.07	(1.3 ± 0.2)(-2)	
	→ 1.347	$\to 1^+$		44 ± 2	[0]	(4.3 ± 0.6)(-1)	
	1.89 → 0	$3^+ \to 4^+$	38 ± 7 fs	35 ± 1	≈ 0	(4.4 ± 0.9)(-2)	
	→ 0.56	$\to 2^+$		65 ± 1	≈ 0	(2.3 ± 0.5)(-1)	
	2.51 → 0.56	$3^+ \to 2^+$	14 ± 4 fs	96 ± 1	≈ 0	(2.9 ± 0.8)(-1)	
^{24}Mg	9.515 → 8.437	$4^+;1 \to 4^+$	25 ± 10 fs	36.9 ± 1.2	[0]	(2.9 ± 1.2)(-1)	44,48
	9.97 → 0	$1^+;1 \to 0^+$	75 ± 20 as	65 ± 2	0	(2.7 ± 0.7)(-1)	
	10.71 → 0	$1^+;1 \to 0^+$	33 ± 3 as	78 ± 4	0	(6.0 ± 0.7)(-1)	
	15.43 → 9.97	$0^+;2 \to 1^+;1$	2.6 ± 0.6 eV	81 ± 2	0	(6.2 ± 1.4)(-1)	
	→ 10.71	$\to 1^+;1$		19 ± 2	0	(2.2 ± 0.6)(-1)	
^{25}Na	0.09 → 0	$3/2^+ \to 5/2^+$	7.4 ± 0.4 ns	100	[0]	(5.9 ± 0.3)(-3)	
^{25}Mg	0.97 → 0	$3/2^+ \to 5/2^+$	16.4 ± 0.9 ps	51 ± 1	-0.36 ± 0.02	(9.4 ± 0.5)(-4)	
	→ 0.59	$\to 1/2^+$		49 ± 1	-0.13 ± 0.03	(1.5 ± 0.1)(-2)	
	1.61 → 0	$7/2^+ \to 5/2^+$	21 ± 3 fs	100	+0.189 ± 0.012	(3.4 ± 0.5)(-1)	
	1.96 → 0	$5/2^+ \to 5/2^+$	1.0 ± 0.4 ps	26 ± 1	+0.60 ± 0.10	(7 ± 3)(-4)	
	→ 0.97	$\to 3/2^+$		27 ± 1	+0.25 ± 0.02	(9 ± 4)(-3)	
	2.56 → 0.59	$1/2^+ \to 1/2^+$	15 ± 5 fs	80 ± 1	0	(2.2 ± 0.7)(-1)	

TABLE X. Strengths of Isospin-Allowed $M1$ Transitions ($M1_{IV}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J^{\pi}_i;T_i \rightarrow J^{\pi}_f;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{25}Mg	2.56 → 0.97	$1/2^+ \rightarrow 3/2^+$	15 ± 5 fs	17 ± 1	[0]	(9 ± 3)(-2)	
	2.74 → 0	$7/2^+ \rightarrow 5/2^+$	400 ± 40 fs	6 ± 1	+2.9 ± 0.5	(2.5 ± 0.9)(-5)	
	→ 1.96	$\rightarrow 5/2^+$		7 ± 1	-0.47 ± 0.16	(1.2 ± 0.2)(-2)	
	2.80 → 0	$3/2^+ \rightarrow 5/2^+$	40 ± 10 fs	22 ± 1	+0.64 ± 0.08	(5.6 ± 1.4)(-3)	
	→ 1.96	$\rightarrow 5/2^+$		39 ± 1	≈ 0	(4.9 ± 1.3)(-1)	
	3.405 → 1.61	$9/2^+ \rightarrow 7/2^+$	10.2 ± 0.6 fs	81 ± 1	+0.14 ± 0.02	(4.2 ± 0.3)(-1)	
	4.06 → 1.61	$9/2^+ \rightarrow 7/2^+$	76 ± 5 fs	39 ± 1	+0.46 ± 0.10	(9.0 ± 0.9)(-3)	
	→ 3.405	$\rightarrow 9/2^+$		1.0 ± 0.2	[0]	(1.4 ± 0.3)(-2)	
	5.25 → 4.06	$(7/2,11/2)^+ \rightarrow 9/2^+$	20 ± 5 fs	23 ± 1	[0]	(2.2 ± 0.6)(-1)	
^{25}Al	0.94 → 0	$3/2^+ \rightarrow 5/2^+$	6.2 ± 1.6 ps	44 ± 3	+0.34 ± 0.04	(2.3 ± 0.6)(-3)	
	→ 0.45	$\rightarrow 1/2^+$		56 ± 3	≈ 0	(2.4 ± 0.6)(-2)	
	1.79 → 0	$5/2^+ \rightarrow 5/2^+$	520 ± 70 fs	24 ± 2	-0.82 ± 0.13	(1.6 ± 0.3)(-3)	
	→ 0.94	$\rightarrow 3/2^+$		38 ± 3	-0.17 ± 0.01	(3.6 ± 0.6)(-2)	
	2.72 → 1.79	$7/2^+ \rightarrow 5/2^+$	360 ± 90 fs	15 ± 2	-0.18 ± 0.14	(1.8 ± 0.5)(-2)	
	3.86 → 0	$5/2^+ \rightarrow 5/2^+$	95 ± 30 meV	10.7 ± 0.6	≈ 0	(8 ± 3)(-3)	
	→ 0.94	$\rightarrow 3/2^+$		62.5 ± 1.0	≈ 0	(1.1 ± 0.4)(-1)	
	→ 1.79	$\rightarrow 5/2^+$		5.7 ± 0.3	≈ 0	(3.0 ± 1.0)(-2)	
	→ 2.67	$\rightarrow 3/2^+$		8.5 ± 0.5	-0.11 ± 0.05	(2.2 ± 0.7)(-1)	
	→ 2.72	$\rightarrow 7/2^+$		9.1 ± 0.5	≈ 0	(2.7 ± 0.9)(-2)	
	7.90 → 0	$5/2^+;3/2 \rightarrow 5/2^+$	800 ± 200 meV	50 ± 3	-0.11 ± 0.02	(3.9 ± 1.0)(-2)	
	→ 0.94	$\rightarrow 3/2^+$		13 ± 2	≈ 0	(1.5 ± 0.4)(-2)	
^{26}Mg	2.94 → 1.81	$2^+ \rightarrow 2^+$	200 ± 50 fs	90 ± 1	+0.12 ± 0.02	(1.0 ± 0.3)(-1)	
	3.94 → 1.81	$3^+ \rightarrow 2^+$	900 ± 250 fs	38 ± 1	≈ 0	(1.4 ± 0.4)(-3)	
	→ 2.94	$\rightarrow 2^+$		62 ± 1	≈ 0	(2.1 ± 0.6)(-2)	
	4.35 → 1.81	$3^+ \rightarrow 2^+$	150 ± 30 fs	55 ± 3	+0.10 ± 0.04	(7.1 ± 1.4)(-3)	
	→ 2.94	$\rightarrow 2^+$		45 ± 3	+0.31 ± 0.06	(3.0 ± 0.6)(-2)	
	5.47 → 3.94	$4^+ \rightarrow 3^+$	35 ± 15 fs	29 ± 2	+0.27 ± 0.04	(7 ± 3)(-2)	
	→ 4.32	$\rightarrow 4^+$		55 ± 2	≈ 0	(3.2 ± 1.4)(-1)	
	5.72 → 3.94	$4^+ \rightarrow 3^+$	135 ± 35 fs	38 ± 2	+0.12 ± 0.04	(1.5 ± 0.4)(-2)	
	→ 4.35	$\rightarrow 3^+$		37 ± 2	+0.17 ± 0.03	(3.2 ± 0.8)(-2)	
	→ 4.90	$\rightarrow 4^+$		6 ± 2	-0.1 ± 0.3	(2.5 ± 1.1)(-2)	
^{26}Al	1.06 → 0.23	$1^+ \rightarrow 0^+;1$	36 ± 7 fs	100	0	(1.4 ± 0.3)(0)	
	1.85 → 0.23	$1^+ \rightarrow 0^+;1$	40 ± 10 fs	100	0	(1.8 ± 0.5)(-1)	
	2.070 → 0.42	$2^+;1 \rightarrow 3^+$	17 ± 4 fs	23 ± 2	[0]	(9 ± 2)(-2)	
	→ 1.06	$\rightarrow 1^+$		73 ± 2	≈ 0	(1.3 ± 0.3)(0)	
	2.072 → 0.23	$1^+ \rightarrow 0^+;1$	480 ± 50 fs	100	0	(1.1 ± 0.1)(-2)	
	2.37 → 2.070	$3^+ \rightarrow 2^+;1$	1.4 ± 0.3 ps	53 ± 3	[0]	(4.6 ± 1.0)(-1)	
	2.55 → 2.070	$3^+ \rightarrow 2^+;1$	1.00 ± 0.25 ps	62 ± 2	[0]	(1.9 ± 0.5)(-1)	
	2.74 → 0.23	$1^+ \rightarrow 0^+;1$	46 ± 8 fs	100	0	(4.3 ± 0.8)(-2)	
	2.91 → 2.070	$2^+ \rightarrow 2^+;1$	88 ± 12 fs	61 ± 2	[0]	(3.7 ± 0.5)(-1)	
	3.07 → 2.070	$3^+ \rightarrow 2^+;1$	210 ± 60 fs	86 ± 3	[0]	(1.3 ± 0.4)(-1)	
	3.16 → 0.42	$2^+;1 \rightarrow 3^+$	36 ± 10 fs	70 ± 3	≈ 0	(3.0 ± 0.8)(-2)	
	→ 1.06	$\rightarrow 1^+$		16 ± 2	≈ 0	(1.5 ± 0.4)(-2)	
	→ 1.76	$\rightarrow 2^+$		11 ± 2	[0]	(3.4 ± 1.1)(-2)	
	3.60 → 2.070	$3^+ \rightarrow 2^+;1$	36 ± 10 fs	80 ± 10	[0]	(1.9 ± 0.5)(-1)	
	3.68 → 2.070	$3^+ \rightarrow 2^+;1$	27 ± 12 fs	100	[0]	(2.7 ± 1.2)(-1)	
	3.750 → 2.070	$(2,3)^+ \rightarrow 2^+;1$	30 ± 9 fs	60 ± 20	[0]	(1.3 ± 0.6)(-1)	
	3.753 → 1.06	$0^+;1 \rightarrow 1^+$	28 ± 9 fs	100	0	(6 ± 2)(-2)	
	3.96 → 2.070	$3^+ \rightarrow 2^+;1$	54 ± 10 fs	64 ± 15	[0]	(5.5 ± 1.2)(-2)	
^{27}Mg	0.98 → 0	$3/2^+ \rightarrow 1/2^+$	1.4 ± 0.3 ps	100	-0.22 ± 0.02	(2.3 ± 0.5)(-2)	
	1.94 → 0.98	$5/2^+ \rightarrow 3/2^+$	1.1 ± 0.2 ps	66 ± 1	≈ 0	(2.1 ± 0.4)(-2)	
	→ 1.70	$\rightarrow 5/2^+$		1.5 ± 0.6	[0]	(3.1 ± 1.2)(-2)	
	3.11 → 1.94	$(3/2,7/2)^+ \rightarrow 5/2^+$	100 ± 25 fs	87 ± 2	[0]	(1.7 ± 0.4)(-1)	
^{27}Al	1.01 → 0	$3/2^+ \rightarrow 5/2^+$	2.12 ± 0.08 ps	97.10 ± 0.10	+0.351 ± 0.012	(1.2 ± 0.1)(-2)	
	→ 0.84	$\rightarrow 1/2^+$		2.90 ± 0.10	≈ 0	(8.7 ± 0.5)(-2)	

TABLE X. Strengths of Isospin-Allowed $M1$ Transitions ($M1_{IV}$)

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Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{27}Al	2.21 → 0	$7/2^+ \rightarrow 5/2^+$	39.1 ± 1.0 fs	100	-0.468 ± 0.009	(6.0 ± 0.2)(-2)	
	2.73 → 0	$5/2^+ \rightarrow 5/2^+$	13 ± 4 fs	22.1 ± 1.0	-0.18 ± 0.06	(2.5 ± 0.8)(-2)	
	→ 1.01	$\rightarrow 3/2^+$		75.7 ± 1.1	-0.115 ± 0.008	(3.5 ± 1.1)(-1)	
	→ 2.21	$\rightarrow 7/2^+$		0.40 ± 0.14	[0]	(7 ± 3)(-2)	
	2.98 → 0	$3/2^+ \rightarrow 5/2^+$	5.7 ± 0.3 fs	97.4 ± 0.5	≈ 0	(2.0 ± 0.1)(-1)	
	3.00 → 2.21	$9/2^+ \rightarrow 7/2^+$	88 ± 4 fs	11.4 ± 1.1	≈ 0	(8.2 ± 0.8)(-2)	
	3.96 → 2.73	$3/2^+ \rightarrow 5/2^+$	3.5 ± 0.4 fs	5.8 ± 0.4	[0]	(2.8 ± 0.4)(-1)	
	4.41 → 0	$5/2^+ \rightarrow 5/2^+$	1.6 ± 0.2 fs	59 ± 3	≈ 0	(1.3 ± 0.2)(-1)	
	→ 1.01	$\rightarrow 3/2^+$		34 ± 3	≈ 0	(1.7 ± 0.3)(-1)	
	→ 2.73	$\rightarrow 5/2^+$		2.4 ± 0.5	[0]	(1.0 ± 0.2)(-1)	
	4.51 → 3.00	$11/2^+ \rightarrow 9/2^+$	320 ± 30 fs	23 ± 2	-0.70 ± 0.10	(4.4 ± 0.7)(-3)	
	4.58 → 0	$7/2^+ \rightarrow 5/2^+$	19 ± 6 fs	75 ± 3	-0.24 ± 0.03	(1.2 ± 0.4)(-2)	
	→ 2.21	$\rightarrow 7/2^+$		16 ± 3	≈ 0	(2.0 ± 0.7)(-2)	
	5.67 → 3.00	$9/2^+ \rightarrow 9/2^+$	16 ± 4 fs	45 ± 5	+0.18 ± 0.05	(4.6 ± 1.2)(-2)	
	6.51 → 3.00	$11/2^+ \rightarrow 9/2^+$	17 ± 6 fs	35 ± 7	+0.33 ± 0.05	(1.3 ± 0.5)(-2)	
	7.81 → 2.21	$9/2^+ \rightarrow 7/2^+$	26 ± 6 fs	80 ± 5	+0.12 ± 0.04	(5.4 ± 1.3)(-3)	
	9.08 → 0.84	$1/2^+ \rightarrow 1/2^+$	900 ± 300 meV	11.6 ± 0.7	0	(9 ± 3)(-3)	
	→ 3.68	$\rightarrow 1/2^+$		12.5 ± 0.8	0	(3.4 ± 1.1)(-2)	
	→ 5.75	$\rightarrow 1/2^+$		1.08 ± 0.11	0	(1.2 ± 0.4)(-2)	
	→ 6.81	$\rightarrow 1/2^+;3/2$		0.46 ± 0.05	0	(1.8 ± 0.6)(-2)	
	9.235 → 0.84	$1/2^+ \rightarrow 1/2^+$	1.7 ± 0.5 eV	66	0	(9 ± 3)(-2)	56
	→ 3.68	$\rightarrow 1/2^+$		2.9	0	(1.5 ± 0.5)(-2)	56
	→ 5.75	$\rightarrow 1/2^+$		1.7	0	(3.3 ± 1.1)(-2)	56
	9.40 → 0.84	$1/2^+ \rightarrow 1/2^+$	450 ± 130 meV	9.0	0	(3.0 ± 1.0)(-3)	56
	→ 3.68	$\rightarrow 1/2^+$		20	0	(2.3 ± 0.8)(-2)	56
	→ 5.75	$\rightarrow 1/2^+$		2.3	0	(1.0 ± 0.3)(-2)	56
	→ 6.81	$\rightarrow 1/2^+;3/2$		1.9	0	(2.4 ± 0.8)(-3)	56
	9.633 → 0	$5/2^+ \rightarrow 5/2^+$	470 ± 140 meV	23	+1.2 ± 0.2	(2.4 ± 0.8)(-3)	56
	→ 2.21	$\rightarrow 7/2^+$		16	≈ 0	(9 ± 3)(-3)	56
	→ 2.73	$\rightarrow 5/2^+$		11	+0.13 ± 0.03	(8 ± 3)(-3)	56
	9.76 → 0	$5/2^+ \rightarrow 5/2^+$	750 ± 200 meV	20	-0.16 ± 0.02	(7 ± 3)(-3)	56
	→ 2.21	$\rightarrow 7/2^+$		24	+0.06 ± 0.02	(2.0 ± 0.7)(-2)	56
	9.82 → 2.73	$3/2^+ \rightarrow 5/2^+$	850 ± 250 meV	21	-0.13 ± 0.03	(2.3 ± 0.8)(-2)	56
	9.83 → 4.05	$1/2^- \rightarrow 1/2^-$	750 ± 200 meV	4.6	0	(8 ± 3)(-3)	56
	9.85 → 0.84	$1/2^+ \rightarrow 1/2^+$	520 ± 160 meV	39	0	(1.3 ± 0.4)(-2)	56
	→ 3.68	$\rightarrow 1/2^+$		6.5	0	(7 ± 2)(-3)	56
	→ 7.07	$\rightarrow 1/2^+$		1.9	0	(2.2 ± 0.7)(-2)	56
	→ 7.86	$\rightarrow 3/2^+;3/2$		1.6	[0]	(5.1 ± 1.7)(-2)	56
^{27}Si	0.96 → 0	$3/2^+ \rightarrow 5/2^+$	1.8 ± 0.2 ps	94 ± 2	-0.50 ± 0.04	(1.5 ± 0.2)(-2)	
	→ 0.78	$\rightarrow 1/2^+$		6 ± 2	[0]	(1.9 ± 0.6)(-1)	
	2.16 → 0	$7/2^+ \rightarrow 5/2^+$	50 ± 7 fs	100	+0.43 ± 0.04	(5.2 ± 0.7)(-2)	
	2.65 → 0	$5/2^+ \rightarrow 5/2^+$	25 ± 10 fs	20 ± 3	+0.40 ± 0.06	(1.1 ± 0.5)(-2)	
	→ 0.96	$\rightarrow 3/2^+$		77 ± 3	≈ 0	(2.1 ± 0.8)(-1)	
	2.91 → 2.16	$9/2^+ \rightarrow 7/2^+$	76 ± 8 fs	6 ± 2	[0]	(6 ± 2)(-2)	
^{28}Al	0.03 → 0	$2^+ \rightarrow 3^+$	3.00 ± 0.07 ns	100	≈ 0	(3.7 ± 0.1)(-1)	α = 0.07
	1.01 → 0	$3^+ \rightarrow 3^+$	150 ± 30 fs	37 ± 1	[0]	(7.4 ± 1.5)(-2)	
	→ 0.03	$\rightarrow 2^+$		63 ± 1	-0.13 ± 0.05	(1.3 ± 0.3)(-1)	
	1.37 → 0.03	$1^+ \rightarrow 2^+$	320 ± 50 fs	55 ± 1	+0.14 ± 0.09	(2.2 ± 0.3)(-2)	
	→ 0.97	$\rightarrow 0^+$		40 ± 1	0	(6.3 ± 1.0)(-1)	
	2.49 → 1.620	$2^+ \rightarrow 1^+$	105 ± 25 fs	61 ± 4	[0]	(2.8 ± 0.7)(-1)	
	→ 1.623	$\rightarrow 2^+(3^+)$		11 ± 3	[0]	(5.0 ± 1.8)(-2)	
	2.58 → 2.27	$5^+ \rightarrow 4^+$	540 ± 60 fs	5 ± 2	[0]	(1.0 ± 0.4)(-1)	
	4.03 → 3.47	$5^-(3^-) \rightarrow 4^-$	140 ± 50 fs	51 ± 3	[0]	(6 ± 2)(-1)	
^{28}Si	10.67 → 9.32	$3^+ \rightarrow 3^+;1$	22 ± 7 fs	20 ± 2	[0]	(1.1 ± 0.4)(-1)	
	10.90 → 0	$1^+;1 \rightarrow 0^+$	105 ± 7 as	68 ± 3	0	(1.6 ± 0.1)(-1)	

TABLE X. Strengths of Isospin-Allowed $M1$ Transitions ($M1_{IV}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{28}Si	11.45 → 0	$1^+;1 \rightarrow 0^+$	23.6 ± 1.1 as	100	0	(8.5 ± 0.4)(-1)	
	12.073 → 10.38	$2^+ \rightarrow 3^+;1$	180 meV	5.7	[0]	(1.0 ± 0.3)(-1)	
	12.29 → 9.32	$2^+ \rightarrow 3^+;1$	230 meV	9.8	[0]	(4.1 ± 1.4)(-2)	
	→ 9.38	$\rightarrow 2^+;1$		31	[0]	(1.4 ± 0.5)(-1)	
	12.332 → 0	$1^+;1 \rightarrow 0^+$	9.7 ± 0.4 eV	75	0	(1.9 ± 0.6)(-1)	
	→ 6.69	$\rightarrow 0^+$		3.2	0	(8 ± 3)(-2)	
	→ 7.38	$\rightarrow 2^+$		9.5	[0]	(3.6 ± 1.2)(-1)	
	→ 7.93	$\rightarrow 2^+$		2.8	[0]	(1.5 ± 0.5)(-1)	
	→ 8.33	$\rightarrow 1^+$		1.5	[0]	(1.1 ± 0.4)(-1)	
	12.44 → 9.32	$2^+ \rightarrow 3^+;1$	240 meV	11	[0]	(4.1 ± 1.3)(-2)	
	12.66 → 8.41	$4^-;1 \rightarrow 4^-$	610 meV	45	[0]	(1.7 ± 0.6)(-1)	
^{29}Al	1.75 → 0	$7/2^+ \rightarrow 5/2^+$	40 ± 15 fs	100	-0.16 ± 0.02	(1.4 ± 0.6)(-1)	
	2.87 → 1.40	$3/2^+ \rightarrow 1/2^+$	110 ± 30 fs	44 ± 1	≈ 0	(4.2 ± 1.1)(-2)	
	3.06 → 1.75	$5/2^+ \rightarrow 7/2^+$	80 ± 30 fs	67 ± 3	-0.08 ± 0.04	(1.2 ± 0.5)(-1)	
	3.18 → 1.75	$5/2^+ \rightarrow 7/2^+$	180 ± 30 fs	24 ± 2	-0.26 ± 0.06	(1.3 ± 0.2)(-2)	
	→ 2.22	$\rightarrow 3/2^+$		55 ± 2	≈ 0	(1.1 ± 0.2)(-1)	
^{29}Si	1.27 → 0	$3/2^+ \rightarrow 1/2^+$	400 ± 30 fs	100	-0.197 ± 0.009	(3.7 ± 0.3)(-2)	
	2.03 → 1.27	$5/2^+ \rightarrow 3/2^+$	420 ± 30 fs	6.0 ± 0.5	≈ 0	(1.0 ± 0.1)(-2)	
	2.43 → 0	$3/2^+ \rightarrow 1/2^+$	20 ± 5 fs	87 ± 1	+0.32 ± 0.07	(9 ± 2)(-2)	
	→ 1.27	$\rightarrow 3/2^+$		13 ± 1	≈ 0	(1.3 ± 0.3)(-1)	
	→ 2.03	$\rightarrow 5/2^+$		0.4 ± 0.1	[0]	(1.0 ± 0.4)(-1)	
	3.07 → 1.27	$5/2^+ \rightarrow 3/2^+$	20 ± 6 fs	80 ± 4	-0.26 ± 0.02	(2.0 ± 0.6)(-1)	
	→ 2.03	$\rightarrow 5/2^+$		20 ± 4	≈ 0	(2.7 ± 1.0)(-1)	
	4.08 → 2.03	$7/2^+ \rightarrow 5/2^+$	50 ± 8 fs	32 ± 5	≈ 0	(2.3 ± 0.5)(-2)	
	4.74 → 4.08	$9/2^+ \rightarrow 7/2^+$	40 ± 8 fs	7 ± 1	[0]	(1.9 ± 0.5)(-1)	
	4.90 → 1.27	$5/2^+ \rightarrow 3/2^+$	10 ± 3 fs	50 ± 3	≈ 0	(3.3 ± 1.0)(-2)	
	→ 2.03	$\rightarrow 5/2^+$		32 ± 4	≈ 0	(4.2 ± 1.4)(-2)	
	5.25 → 3.62	$9/2^- \rightarrow 7/2^-$	90 ± 15 fs	100	-0.43 ± 0.02	(6.8 ± 1.1)(-2)	
	5.65 → 4.74	$9/2^+ \rightarrow 9/2^+$	40 ± 15 fs	12 ± 2	-0.30 ± 0.06	(1.1 ± 0.5)(-1)	
	5.81 → 2.03	$7/2^+ \rightarrow 5/2^+$	20 ± 9 fs	25 ± 3	-2.0 ± 0.2	(1.5 ± 0.7)(-3)	
	→ 3.07	$\rightarrow 5/2^+$		45 ± 4	≈ 0	(3.5 ± 1.6)(-2)	
^{29}P	1.38 → 0	$3/2^+ \rightarrow 1/2^+$	200 ± 30 fs	100	+0.17 ± 0.02	(5.8 ± 0.9)(-2)	
	1.95 → 1.38	$5/2^+ \rightarrow 3/2^+$	360 ± 40 fs	8 ± 1	≈ 0	(3.7 ± 0.6)(-2)	
	2.42 → 0	$3/2^+ \rightarrow 1/2^+$	30 ± 8 fs	84 ± 3	-0.22 ± 0.02	(5.9 ± 1.6)(-2)	
	→ 1.38	$\rightarrow 3/2^+$		12 ± 2	+0.15 ± 0.14	(1.1 ± 0.4)(-1)	
	4.76 → 0	$1/2^+ \rightarrow 1/2^+$	560 ± 170 meV	90 ± 2	0	(2.2 ± 0.7)(-1)	
	8.38 → 1.38	$5/2^+;3/2 \rightarrow 3/2^+$	970 ± 360 meV	15 ± 2	-0.09 ± 0.05	(2.0 ± 0.8)(-2)	
	→ 1.95	$\rightarrow 5/2^+$		54 ± 2	+0.18 ± 0.06	(9 ± 3)(-2)	
	→ 2.42	$\rightarrow 3/2^+$		31 ± 2	-0.02 ± 0.03	(7 ± 2)(-2)	
^{30}Si	3.50 → 2.24	$2^+ \rightarrow 2^+$	83 ± 7 fs	55.3 ± 1.5	-0.18 ± 0.04	(1.0 ± 0.1)(-1)	
	4.81 → 2.24	$2^+ \rightarrow 2^+$	170 ± 45 fs	16 ± 1	+0.52 ± 0.11	(1.4 ± 0.4)(-3)	
	→ 3.50	$\rightarrow 2^+$		44 ± 2	+0.17 ± 0.06	(3.5 ± 0.9)(-2)	
	4.83 → 2.24	$3^+ \rightarrow 2^+$	145 ± 30 fs	92 ± 3	-0.65 ± 0.11	(8.0 ± 1.8)(-3)	
	5.23 → 3.50	$3^+ \rightarrow 2^+$	100 ± 30 fs	75 ± 2	-0.12 ± 0.06	(4.5 ± 1.4)(-2)	
	→ 4.83	$\rightarrow 3^+$		4.0 ± 1.1	[0]	(2.0 ± 0.8)(-1)	
	5.37 → 3.77	$0^+ \rightarrow 1^+$	85 ± 30 fs	29 ± 11	0	(2.7 ± 1.3)(-2)	
	7.04 → 6.50	$5^- \rightarrow 4^-$	1.3 ± 0.3 ps	36 ± 4	[0]	(5.5 ± 1.4)(-2)	
^{30}P	0.68 → 0	$0^+;1 \rightarrow 1^+$	150 ± 25 fs	100	0	(6.7 ± 1.1)(-1)	
	2.94 → 1.45	$2^+;1 \rightarrow 2^+$	105 ± 20 fs	42 ± 2	≈ 0	(3.8 ± 0.8)(-2)	
	3.02 → 0.68	$1^+ \rightarrow 0^+;1$	34 ± 10 fs	100	0	(7 ± 2)(-2)	
	3.73 → 0.68	$1^+ \rightarrow 0^+;1$	50 ± 10 fs	29 ± 5	0	(6.3 ± 1.7)(-3)	
	→ 2.94	$\rightarrow 2^+;1$		7 ± 3	[0]	(9 ± 4)(-2)	
	3.83 → 2.94	$2^+ \rightarrow 2^+;1$	55 ± 20 fs	60 ± 6	[0]	(4.8 ± 1.8)(-1)	
	4.95 → 0.68	$1^+ \rightarrow 0^+;1$	47 ± 20 fs	100	0	(9 ± 4)(-3)	
	6.86 → 0.68	$1^+ \rightarrow 0^+;1$	570 ± 170 meV	76	0	(9 ± 3)(-2)	

TABLE X. Strengths of Isospin-Allowed $M1$ Transitions ($M1_{IV}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{30}P	6.86 → 2.94	$1^+ \rightarrow 2^+;1$	570 ± 170 meV	14	-0.22 ± 0.06	(6 ± 2)(-2)	
	→ 4.47	$\rightarrow 0^+;1$		6	0	(1.2 ± 0.4)(-1)	
^{30}S	3.40 → 2.21	$2^+ \rightarrow 2^+$	135 ± 30 fs	80 ± 3	[0]	(1.4 ± 0.5)(-1)	
^{31}Si	0.75 → 0	$1/2^+ \rightarrow 3/2^+$	760 ± 140 fs	100	[0]	(1.0 ± 0.2)(-1)	
	1.69 → 0	$5/2^+ \rightarrow 3/2^+$	820 ± 160 fs	100	-4.4 ± 0.7	(4.0 ± 1.4)(-4)	
	2.32 → 1.69	$3/2^+ \rightarrow 5/2^+$	55 ± 25 fs	9.9 ± 0.7	[0]	(6 ± 3)(-1)	
^{31}P	1.27 → 0	$3/2^+ \rightarrow 1/2^+$	750 ± 50 fs	100	+0.30 ± 0.01	(1.9 ± 0.1)(-2)	
	3.13 → 0	$1/2^+ \rightarrow 1/2^+$	9.7 ± 0.7 fs	97.3 ± 0.3	0	(1.0 ± 0.1)(-1)	
	3.30 → 1.27	$5/2^+ \rightarrow 3/2^+$	115 ± 20 fs	78.2 ± 1.0	-0.40 ± 0.02	(2.3 ± 0.4)(-2)	
	→ 2.23	$\rightarrow 5/2^+$		20.7 ± 1.0	-0.40 ± 0.05	(3.9 ± 0.7)(-2)	
	3.41 → 2.23	$7/2^+ \rightarrow 5/2^+$	315 ± 40 fs	2.7 ± 0.5	+0.35 ± 0.07	(1.5 ± 0.2)(-3)	
	3.51 → 0	$3/2^+ \rightarrow 1/2^+$	12.1 ± 1.9 fs	59 ± 2	-0.43 ± 0.02	(3.0 ± 0.5)(-2)	
	4.19 → 1.27	$5/2^+ \rightarrow 3/2^+$	7 ± 3 fs	76 ± 2	+0.11 ± 0.03	(1.4 ± 0.6)(-1)	
	→ 2.23	$\rightarrow 5/2^+$		24 ± 2	≈ 0	(1.4 ± 0.6)(-1)	
	4.26 → 0	$3/2^+ \rightarrow 1/2^+$	15 ± 5 fs	74.2 ± 1.5	-0.35 ± 0.03	(1.8 ± 0.6)(-2)	
	→ 1.27	$\rightarrow 3/2^+$		25.8 ± 1.5	-0.25 ± 0.04	(1.9 ± 0.6)(-2)	
	4.59 → 0	$3/2^+ \rightarrow 1/2^+$	25 ± 10 fs	24 ± 2	≈ 0	(3.1 ± 1.2)(-3)	
	→ 1.27	$\rightarrow 3/2^+$		57 ± 2	≈ 0	(1.9 ± 0.8)(-2)	
	4.63 → 2.23	$7/2^+ \rightarrow 5/2^+$	110 ± 15 fs	26.3 ± 1.0	-0.45 ± 0.06	(4.5 ± 0.6)(-3)	
	→ 3.30	$\rightarrow 5/2^+$		34.5 ± 1.5	-0.38 ± 0.04	(3.6 ± 0.5)(-2)	
	→ 3.41	$\rightarrow 7/2^+$		36.2 ± 1.0	-0.33 ± 0.06	(5.1 ± 0.7)(-2)	
	4.78 → 3.30	$5/2^+ \rightarrow 5/2^+$	12 ± 4 fs	33 ± 2	≈ 0	(2.6 ± 0.7)(-1)	
	5.12 → 1.27	$5/2^+ \rightarrow 3/2^+$	15 ± 5 fs	50 ± 3	-0.30 ± 0.06	(1.7 ± 0.6)(-2)	
	5.26 → 0	$1/2^+ \rightarrow 1/2^+$	1.9 ± 0.3 fs	100	0	(1.1 ± 0.2)(-1)	
	5.34 → 3.41	$9/2^+ \rightarrow 7/2^+$	60 ± 15 fs	82 ± 3	≈ 0	(6.0 ± 1.5)(-2)	
	5.89 → 3.41	$9/2^+ \rightarrow 7/2^+$	33 ± 8 fs	9 ± 2	-0.23 ± 0.06	(5.3 ± 1.8)(-3)	
	6.501 → 4.43	$9/2^- \rightarrow 7/2^-$	55 ± 17 fs	75 ± 5	-1.3 ± 0.3	(2.1 ± 1.0)(-2)	
	6.79 → 4.43	$9/2^- \rightarrow 7/2^-$	205 ± 40 fs	75 ± 8	+0.29 ± 0.04	(9 ± 2)(-3)	
	7.14 → 0	$1/2^+;3/2 \rightarrow 1/2^+$	330 ± 30 as	84 ± 4	0	(2.2 ± 0.2)(-1)	
	8.46 → 1.27	$5/2^+ \rightarrow 3/2^+$	230 ± 70 meV	4.0	-0.100 ± 0.005	(1.1 ± 0.4)(-3)	
	→ 2.23	$\rightarrow 5/2^+$		26	-0.100 ± 0.011	(1.2 ± 0.4)(-2)	
	8.576 → 1.27	$5/2^+ \rightarrow 3/2^+$	390 ± 120 meV	36	≈ 0	(1.6 ± 0.5)(-2)	
	8.64 → 1.27	$5/2^+ \rightarrow 3/2^+$	510 ± 150 meV	51	≈ 0	(3.1 ± 1.0)(-2)	
	8.74 → 1.27	$3/2^+;3/2 \rightarrow 3/2^+$	430 ± 130 meV	6.4	-0.12 ± 0.05	(3.1 ± 1.0)(-3)	
	8.757 → 1.27	$5/2^+ \rightarrow 3/2^+$	510 ± 150 meV	55	-0.206 ± 0.003	(3.1 ± 1.0)(-2)	
	8.763 → 0	$1/2^+ \rightarrow 1/2^+$	370 ± 180 meV	80	0	(2.1 ± 0.7)(-2)	
	→ 3.13	$\rightarrow 1/2^+$		3.0	0	(2.9 ± 1.0)(-3)	
	→ 6.34	$\rightarrow 1/2^+$		2.0	0	(2.5 ± 0.8)(-2)	
	8.90 → 0	$1/2^+ \rightarrow 1/2^+$	370 ± 110 meV	1.4	0	(3.4 ± 1.1)(-4)	
	→ 3.13	$\rightarrow 1/2^+$		35	0	(3.2 ± 1.1)(-2)	
	8.91 → 1.27	$5/2^+ \rightarrow 3/2^+$	120 ± 35 meV	24	≈ 0	(3.1 ± 1.0)(-3)	
	8.94 → 2.23	$3/2^+ \rightarrow 5/2^+$	520 ± 160 meV	36	+0.17 ± 0.05	(2.9 ± 1.0)(-2)	
	9.01 → 2.23	$5/2^+ \rightarrow 5/2^+$	400 ± 120 meV	6.0	-0.64 ± 0.10	(1.7 ± 0.6)(-3)	
	9.07 → 2.23	$5/2^+ \rightarrow 5/2^+$	490 ± 150 meV	42	≈ 0	(3.1 ± 1.0)(-2)	
	9.12 → 2.23	$5/2^+ \rightarrow 5/2^+$	700 ± 120 meV	49	≈ 0	(5.0 ± 1.7)(-2)	
	9.129 → 2.23	$5/2^+ \rightarrow 5/2^+$	85 ± 25 meV	18	-1.18 ± 0.09	(9 ± 3)(-4)	
	9.131 → 1.27	$5/2^+ \rightarrow 3/2^+$	200 ± 60 meV	29	≈ 0	(5.8 ± 1.9)(-3)	
	9.40 → 0	$1/2^+ \rightarrow 1/2^+$	110 ± 35 meV	26	0	(1.7 ± 0.6)(-3)	
	→ 3.13	$\rightarrow 1/2^+$		26	0	(5.6 ± 0.9)(-3)	
	9.41 → 4.43	$7/2^-;(3/2) \rightarrow 7/2^-$	1.4 ± 0.4 eV	87	≈ 0	(4.7 ± 1.6)(-1)	
	9.45 → 6.38	$5/2^+ \rightarrow 3/2^+;3/2$	440 ± 130 meV	11	[0]	(6 ± 2)(-2)	
^{31}S	[1.25 → 0	$3/2^+ \rightarrow 1/2^+$	320 ± 80 fs	100	-0.35 ± 0.02	(2.0 ± 0.5)(-2)]	$\lvert\delta\rvert >> 0$ possible
^{32}Si	4.23 → 1.94	$2^+ \rightarrow 2^+$	380 ± 130 fs	38 ± 3	+0.8 ± 0.4	(1.6 ± 0.8)(-3)	
^{32}P	0.08 → 0	$2^+ \rightarrow 1^+$	401 ± 17 ps	100	[0]	(1.6 ± 0.1)(-1)	
	0.51 → 0	$0^+ \rightarrow 1^+$	3.0 ± 0.9 ps	100	0	(8 ± 2)(-2)	

TABLE X. Strengths of Isospin-Allowed $M1$ Transitions ($M1_{IV}$)

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Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{32}P	1.15 → 0.51	$1^+ \rightarrow 0^+$	230 ± 35 fs	49.7 ± 1.7	0	(2.5 ± 0.4)(-1)	
	1.75 → 0.08	$3^+ \rightarrow 2^+$	510 ± 55 fs	95.9 ± 0.5	+0.79 ± 0.08	(7.9 ± 1.0)(-3)	
	→ 1.32	$\rightarrow 2^+$		2.0 ± 0.1	+0.12 ± 0.10	(1.5 ± 0.2)(-2)	
	2.18 → 0.08	$3^+ \rightarrow 2^+$	62 ± 11 fs	91.0 ± 0.9	-0.14 ± 0.03	(5.0 ± 0.9)(-2)	
	2.22 → 0	$2^+ \rightarrow 1^+$	220 ± 35 fs	47 ± 2	+0.5 ± 0.2	(4.9 ± 1.1)(-3)	
	→ 1.32	$\rightarrow 2^+$		32 ± 1	≈ 0	(6.3 ± 1.0)(-2)	
	3.00 → 1.32	$3^+ \rightarrow 2^+$	60 ± 20 fs	4.4 ± 0.5	+1.7 ± 0.8	(1.3 ± 0.6)(-3)	
	→ 2.18	$\rightarrow 3^+$		4.0 ± 0.3	+0.11 ± 0.16	(3.8 ± 1.3)(-2)	
	3.15 → 1.75	$4^+ \rightarrow 3^+$	520 ± 60 fs	13.4 ± 0.6	+4.8 ± 1.2	(1.2 ± 0.6)(-4)	
	→ 2.18	$\rightarrow 3^+$		20.2 ± 0.3	+0.11 ± 0.04	(1.4 ± 0.2)(-2)	
	4.28 → 3.443	$5^- \rightarrow 4^-$	770 ± 120 fs	77.0 ± 1.2	+0.14 ± 0.02	(5.2 ± 0.8)(-2)	
^{32}S	8.13 → 0	$1^+;1 \rightarrow 0^+$	150 ± 30 as	87 ± 4	0	(3.4 ± 0.7)(-1)	
	10.08 → 6.22	$2^-;1 \rightarrow 2^-$	1.0 eV	45	[0]	(3.7 ± 1.2)(-1)	
	10.32 → 7.00	$1^+ \rightarrow 1^+;1$	310 meV	48	[0]	(2.1 ± 0.7)(-1)	
	→ 7.54	$\rightarrow 0^+;1$		4	0	(3.0 ± 1.0)(-2)	
	12.05 → 7.00	$0^+;2 \rightarrow 1^+;1$	4.8 ± 1.4 eV	6 ± 1	0	(3.7 ± 1.3)(-2)	
	→ 8.13	$\rightarrow 1^+;1$		83 ± 2	0	(1.1 ± 0.3)(0)	
	→ 9.21	$\rightarrow 1^+;1$		11 ± 2	0	(3.9 ± 1.4)(-1)	
^{33}P	1.43 → 0	$3/2^+ \rightarrow 1/2^+$	650 ± 80 fs	100	+0.60 ± 0.09	(1.1 ± 0.1)(-2)	
	1.85 → 1.43	$5/2^+ \rightarrow 3/2^+$	1.2 ± 0.2 ps	7 ± 2	≈ 0	(2.4 ± 0.8)(-2)	
	3.49 → 1.43	$5/2^+ \rightarrow 3/2^+$	90 ± 20 fs	40 ± 4	+0.4 ± 0.3	(1.4 ± 0.5)(-2)	
	3.63 → 1.85	$7/2^+ \rightarrow 5/2^+$	200 ± 35 fs	30 ± 2	≈ 0	(8.2 ± 1.5)(-3)	
	5.45 → 4.23	$9/2^- \rightarrow 7/2^-$	35 ± 7 ps	100	-0.9 ± 0.1	(2.7 ± 0.6)(-4)	
	5.64 → 5.45	$11/2^- \rightarrow 9/2$	14 ± 2 ps	46 ± 2	[0]	(1.6 ± 0.2)(-1)	
^{33}S	0.84 → 0	$1/2^+ \rightarrow 3/2^+$	1.69 ± 0.04 ps	100	±0.151 ± 0.004	(2.9 ± 0.1)(-2)	
	1.97 → 0	$5/2^+ \rightarrow 3/2^+$	150 ± 20 fs	100	+0.56 ± 0.03	(2.1 ± 0.3)(-2)	
	2.31 → 0.84	$3/2^+ \rightarrow 1/2^+$	155 ± 25 fs	67 ± 2	+0.35 ± 0.03	(3.8 ± 0.6)(-2)	
	2.87 → 0	$5/2^+ \rightarrow 3/2^+$	27 ± 12 fs	100	-0.114 ± 0.009	(5 ± 2)(-2)	
	2.97 → 1.97	$7/2^+ \rightarrow 5/2^+$	90 ± 15 fs	9 ± 2	≈ 0	(3.1 ± 0.9)(-2)	
	3.83 → 2.97	$5/2^+ \rightarrow 7/2^+$	44 ± 8 fs	9 ± 1	-0.26 ± 0.15	(9 ± 2)(-2)	
	4.048 → 2.97	$9/2^+ \rightarrow 7/2^+$	305 ± 50 fs	10 ± 1	+0.34 ± 0.04	(7.1 ± 1.4)(-3)	
	4.09 → 1.97	$7/2^+ \rightarrow 5/2^+$	45 ± 7 fs	88 ± 1	-0.26 ± 0.05	(6.0 ± 0.9)(-2)	
^{33}Cl	0.81 → 0	$1/2^+ \rightarrow 3/2^+$	1.8 ± 0.3 ps	100	[0]	(3.4 ± 0.6)(-2)	
	1.99 → 0	$5/2^+ \rightarrow 3/2^+$	80 ± 15 fs	100	-0.42 ± 0.10	(4.2 ± 0.8)(-2)	
	2.35 → 0	$3/2^+ \rightarrow 3/2^+$	100 ± 30 fs	26 ± 2	-1.3 ± 0.4	(2.4 ± 1.2)(-3)	
	→ 0.81	$\rightarrow 1/2^+$		74 ± 2	-0.41 ± 0.08	(5.3 ± 1.6)(-2)	
	5.54 → 0.81	$1/2^+;3/2 \rightarrow 1/2^+$	600 ± 180 meV	92 ± 2	0	(2.5 ± 0.8)(-1)	
^{34}S	3.30 → 2.13	$2^+ \rightarrow 2^+$	192 ± 13 fs	55.9 ± 1.1	+0.16 ± 0.02	(5.5 ± 0.4)(-2)	
	4.11 → 2.13	$2^+ \rightarrow 2^+$	100 ± 15 fs	44 ± 2	+0.47 ± 0.10	(1.5 ± 0.3)(-2)	
	6.64 → 4.62	$4^- \rightarrow 3^-$	60 ± 13 fs	70 ± 2	≈ 0	(4.4 ± 0.9)(-2)	
	→ 5.69	$\rightarrow 5^-$		30 ± 2	[0]	(1.8 ± 0.4)(-1)	
	6.86 → 5.69	$5^- \rightarrow 5^-$	39 ± 9 fs	21 ± 2	[0]	(1.0 ± 0.3)(-1)	
	7.79 → 5.69	$6^- \rightarrow 5^-$	115 ± 35 fs	83	+1.7 ± 0.2	(6 ± 2)(-3)	
	8.08 → 5.69	$5^- \rightarrow 5^-$	64 ± 12 fs	26 ± 3	-0.2 ± 0.2	(9 ± 3)(-3)	
	→ 6.86	$\rightarrow 5^-$		62 ± 3	-0.3 ± 0.4	(1.5 ± 0.3)(-1)	
^{34}Cl	0.46 → 0	$1^+ \rightarrow 0^+;1$	7.5 ± 0.5 ps	100	0	(4.4 ± 0.3)(-2)	
	0.67 → 0	$1^+ \rightarrow 0^+;1$	13.2 ± 0.8 ps	100	0	(7.7 ± 0.5)(-3)	
	2.16 → 0.15	$2^+;1 \rightarrow 3^+$	50 ± 10 fs	14 ± 1	-0.22 ± 0.10	(1.0 ± 0.2)(-2)	
	→ 0.46	$\rightarrow 1^+$		66 ± 2	≈ 0	(8.4 ± 1.7)(-2)	
	→ 1.23	$\rightarrow 2^+$		6 ± 1	-0.1 ± 0.5	(4.6 ± 1.2)(-2)	
	2.61 → 2.16	$3^+ \rightarrow 2^+;1$	820 ± 350 fs	23 ± 1	[0]	(1.0 ± 0.4)(-1)	
	3.13 → 0	$1^+ \rightarrow 0^+;1$	40 ± 12 fs	100	0	(2.5 ± 0.8)(-2)	
	3.33 → 2.16	$(2.3)^+ \rightarrow 2^+;1$	115 ± 32 fs	67 ± 6	[0]	(1.1 ± 0.3)(-1)	
	6.17 → 3.55	$3^-;1 \rightarrow 3^-$	130 ± 40 meV	5	+0.05 ± 0.17	(1.7 ± 0.6)(-2)	
	→ 3.98	$\rightarrow 3^-$		34	+0.02 ± 0.05	(2.0 ± 0.7)(-1)	

TABLE X. Strengths of Isospin-Allowed $M1$ Transitions ($M1_{IV}$)

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Nucleus	$E_{xi} \to E_{xf}$ (MeV)	$J^{\pi}_i;T_i \to J^{\pi}_f;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{34}Cl	6.17 → 4.08	$3^-;1 \to 4^-$	130 ± 40 meV	5	[0]	(3.4 ± 1.1)(-2)	
	→ 4.52	$\to 2^-$		1.5	[0]	(2.1 ± 0.7)(-2)	
	6.64 → 3.55	$4^-;1 \to 3^-$	260 ± 80 meV	18	-0.04 ± 0.02	(8 ± 3)(-2)	
	→ 3.60	$\to 4^-$		5	+0.12 ± 0.03	(2.2 ± 0.7)(-2)	
	→ 4.08	$\to 4^-$		38	+0.14 ± 0.03	(2.8 ± 0.9)(-1)	
	6.87 → 3.63	$5^-;1 \to 5^-$	90 ± 25 meV	44	-0.04 ± 0.07	(5.6 ± 1.9)(-2)	
^{34}Ar	3.29 → 2.09	$2^+ \to 2^+$	155 ± 40 fs	89 ± 3	-0.12 ± 0.05	(1.1 ± 0.3)(-1)	
^{35}Cl	1.22 → 0	$1/2^+ \to 3/2^+$	220 ± 30 fs	100	±0.106 ± 0.008	(7.9 ± 1.1)(-2)	
	1.76 → 0	$5/2^+ \to 3/2^+$	600 ± 40 fs	100	+2.85 ± 0.10	(1.2 ± 0.1)(-3)	
	2.65 → 1.76	$7/2^+ \to 5/2^+$	275 ± 40 fs	9.4 ± 1.0	+0.25 ± 0.05	(1.4 ± 0.2)(-2)	
	2.69 → 0	$3/2^+ \to 3/2^+$	35 ± 10 fs	79 ± 2	+0.26 ± 0.03	(3.5 ± 1.0)(-2)	
	→ 1.76	$\to 5/2^+$		13.0 ± 1.0	[0]	(1.4 ± 0.4)(-1)	
	3.00 → 0	$5/2^+ \to 3/2^+$	25 ± 10 fs	100	≈ 0	(4.6 ± 1.8)(-2)	
	3.97 → 1.22	$1/2^+ \to 1/2^+$	18 ± 4 fs	78 ± 3	0	(6.6 ± 1.5)(-2)	
	4.11 → 1.76	$7/2^+ \to 5/2^+$	70 ± 16 fs	48 ± 3	+0.16 ± 0.02	(1.6 ± 0.4)(-2)	
	5.41 → 4.35	$11/2^- \to 9/2^-$	400 ± 140 fs	17.2 ± 0.7	-0.14 ± 0.04	(1.1 ± 0.4)(-2)	
	5.654 → 3.00	$3/2^+;3/2 \to 5/2^+$	20 ± 5 fs	80 ± 5	[0]	(6.7 ± 1.7)(-2)	
	6.09 → 5.41	$13/2^- \to 11/2^-$	8.9 ± 0.7 ps	85 ± 5	≈ 0	(1.0 ± 0.1)(-2)	
	7.55 → 3.16	$7/2^-;3/2 \to 7/2^-$	1.3 ± 0.1 eV	95	≈ 0	(7 ± 2)(-1)	
	8.01 → 0	$5/2^+ \to 3/2^+$	370 ± 110 meV	55	≈ 0	(1.9 ± 0.6)(-2)	
	→ 1.76	$\to 5/2^+$		15	≈ 0	(1.1 ± 0.4)(-2)	
	8.58 → 1.22	$1/2^+ \to 1/2^+$	500 ± 150 meV	54	0	(3.2 ± 1.1)(-2)	
	8.63 → 4.35	$7/2^- \to 9/2^-$	340 ± 100 meV	12	+0.184 ± 0.014	(2.6 ± 0.9)(-2)	
	→ 5.16	$\to 7/2^-$		8.4	-0.60 ± 0.10	(2.5 ± 0.8)(-2)	
	8.825 → 1.22	$1/2^+ \to 1/2^+$	1.9 ± 0.6 eV	22	0	(4.6 ± 1.5)(-2)	
	9.08 → 0	$5/2^+;(3/2) \to 3/2^+$	2.7 ± 0.8 eV	60	-0.089 ± 0.009	(1.0 ± 0.3)(-1)	
	→ 1.76	$\to 5/2^+$		16	-0.11 ± 0.02	(5.2 ± 1.7)(-2)	
	→ 3.92	$\to 3/2^+$		9.0	+0.002 ± 0.009	(8 ± 3)(-2)	
^{36}S	4.52 → 0	$1^+ \to 0^+$	25 ± 12 fs	75 ± 10	0	(1.0 ± 0.5)(-2)	
	4.58 → 3.29	$2^+ \to 2^+$	80 ± 15 fs	100	≈ 0	(1.8 ± 0.3)(-1)	
^{36}Cl	0.79 → 0	$3^+ \to 2^+$	19.9 ± 1.7 ps	100	-1.1 ± 0.2	(1.4 ± 0.3)(-3)	
	1.16 → 0	$1^+ \to 2^+$	9.2 ± 0.6 ps	100	+0.32 ± 0.06	(2.0 ± 0.2)(-3)	
	1.60 → 1.16	$1^+(2^+) \to 1^+$	940 ± 60 fs	19 ± 2	[0]	(7.4 ± 0.9)(-2)	
	1.96 → 1.60	$2^+ \to 1^+(2^+)$	60 ± 15 fs	1.4 ± 0.2	[0]	(1.6 ± 0.5)(-1)	
	2.47 → 1.95	$3^- \to 2^-$	1.50 ± 0.18 ps	97.8 ± 0.2	≈ 0	(1.4 ± 0.2)(-1)	
	2.49 → 1.16	$2^+ \to 1^+$	60 ± 15 fs	69 ± 5	[0]	(1.6 ± 0.4)(-1)	
	→ 1.96	$\to 2^+$		5.8 ± 1.1	[0]	(2.1 ± 0.7)(-1)	
	2.81 → 2.52	$4^- \to 5^-$	4.1 ± 0.8 ps	39 ± 1	≈ 0	(1.2 ± 0.3)(-1)	
	3.10 → 2.47	$4^- \to 3^-$	215 ± 60 fs	57 ± 20	≈ 0	(5.8 ± 1.5)(-1)	
	3.33 → 2.47	$2^- \to 3^-$	105 ± 20 fs	16 ± 3	[0]	(8 ± 2)(-2)	
	→ 2.99	$\to (1\text{-}3)^-$		8 ± 3	[0]	(6 ± 2)(-1)	
	3.60 → 2.47	$3^- \to 3^-$	60 ± 20 fs	48 ± 2	[0]	(1.8 ± 0.6)(-1)	
	→ 2.90	$\to (2,3)^-$		3.2 ± 0.6	[0]	(4.9 ± 1.9)(-2)	
	3.72 → 2.81	$4^- \to 4^-$	70 ± 20 fs	81 ± 5	≈ 0	(4.8 ± 1.4)(-1)	
	→ 3.10	$\to 4^-$		19 ± 5	[0]	(3.6 ± 1.4)(-1)	
	8.579 → 0.79	$2^+ \to 3^+$	500 ± 20 meV	9.2 ± 0.4	+0.22 ± 0.02	(4.4 ± 0.3)(-3)	
	→ 1.16	$\to 1^+$		10.7 ± 0.5	+0.14 ± 0.03	(6.1 ± 0.4)(-3)	
^{36}Ar	7.34 → 4.44	$3^+;1 \to 2^+$	15 ± 7 fs	52 ± 2	≈ 0	(5 ± 2)(-2)	
	9.34 → 4.18	$3^-;1 \to 3^-$	790 ± 200 meV	59	[0]	(1.6 ± 0.5)(-1)	
	→ 6.837	$\to 3^-$		12	[0]	(2.9 ± 1.0)(-1)	
	→ 7.57	$\to 4^-$		1.0	[0]	(7 ± 2)(-1)	
	9.36 → 7.34	$2^+ \to 3^+;1$	80 meV	6	[0]	(2.8 ± 0.9)(-2)	
^{37}Cl	1.73 → 0	$1/2^+ \to 3/2^+$	185 ± 30 fs	100	±0.25 ± 0.02	(3.1 ± 0.5)(-2)	
	3.09 → 0	$5/2^+ \to 3/2^+$	45 ± 15 fs	100	-1.5 ± 0.4	(7 ± 3)(-3)	
	4.011 → 3.10	$9/2^- \to 7/2^-$	33 ± 2 ps	69 ± 1	-0.64 ± 0.08	(6.1 ± 0.6)(-4)	

TABLE X. Strengths of Isospin-Allowed $M1$ Transitions ($M1_{IV}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^{\pi};T_i \rightarrow J_f^{\pi};T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{37}Cl	4.55 → 4.01	$11/2^- \rightarrow 9/2^-$	3.5 ± 1.0 ps	100	≈ 0	(5.7 ± 1.6)(-2)	
	5.27 → 4.55	$13/2^- \rightarrow 11/2^-$	3.5 ± 0.8 ps	100	-0.10 ± 0.03	(2.4 ± 0.5)(-2)	
	10.22 → 3.10	$7/2^-;5/2 \rightarrow 7/2^-$	3.6 ± 1.1 eV	79	0.00 ± 0.02	(3.8 ± 1.3)(-1)	
^{37}Ar	2.80 → 0	$5/2^+ \rightarrow 3/2^+$	20 ± 6 fs	98 ± 1	-0.16 ± 0.01	(7 ± 2)(-2)	
	3.17 → 0	$5/2^+ \rightarrow 3/2^+$	80 ± 10 fs	100	+0.47 ± 0.08	(1.0 ± 0.1)(-2)	
	3.19 → 1.61	$9/2^- \rightarrow 7/2^-$	295 ± 30 fs	100	-0.60 ± 0.04	(1.9 ± 0.2)(-2)	
	3.27 → 1.61	$5/2^- \rightarrow 7/2^-$	45 ± 8 fs	47 ± 2	+0.27 ± 0.04	(6.5 ± 1.2)(-2)	
	→ 2.49	$\rightarrow 3/2^-$		8 ± 1	≈ 0	(1.2 ± 0.3)(-1)	
	3.53 → 3.19	$7/2^- \rightarrow 9/2^-$	590 ± 110 fs	21 ± 2	+0.10 ± 0.14	(2.8 ± 0.6)(-1)	
	→ 3.27	$\rightarrow 5/2^-$		4.0 ± 0.5	[0]	(1.2 ± 0.3)(-1)	
	3.60 → 0	$3/2^+ \rightarrow 3/2^+$	65 ± 15 fs	100	+0.25 ± 0.05	(1.0 ± 0.2)(-2)	
	3.71 → 3.19	$11/2^- \rightarrow 9/2^-$	370 ± 60 fs	15 ± 1	≈ 0	(9 ± 2)(-2)	
	4.02 → 1.61	$9/2^- \rightarrow 7/2^-$	40 ± 15 fs	6.0 ± 0.2	-1.9 ± 0.4	(7 ± 3)(-4)	
	→ 3.19	$\rightarrow 9/2^-$		25.9 ± 1.4	≈ 0	(3.6 ± 1.5)(0)	
	6.15 → 5.21	$13/2^+ \rightarrow 11/2^+$	4.6 ± 0.5 ps	75 ± 5	-0.10 ± 0.01	(6.5 ± 0.7)(-3)	
	6.47 → 6.15	$15/2^+ \rightarrow 13/2^+$	6.8 ± 0.5 ps	65 ± 3	≈ 0	(9.1 ± 0.8)(-2)	
	7.07 → 6.47	$(13/2,17/2)^+ \rightarrow 15/2^+$	550 ± 150 fs	100	[0]	(2.6 ± 0.7)(-1)	
^{38}Cl	0.76 → 0	$3^- \rightarrow 2^-$	320 ± 40 fs	100	[0]	(2.3 ± 0.3)(-1)	
	1.31 → 0.67	$4^- \rightarrow 5^-$	530 ± 80 fs	76.0 ± 0.9	[0]	(1.7 ± 0.3)(-1)	
	→ 0.76	$\rightarrow 3^-$		17.5 ± 0.8	[0]	(6.0 ± 0.9)(-2)	
	1.62 → 1.31	$3^- \rightarrow 4^-$	2.2 ± 0.2 ps	50 ± 2	[0]	(2.7 ± 0.3)(-1)	
	1.78 → 0.76	$(2\text{-}4)^- \rightarrow 3^-$	95 ± 20 fs	100	[0]	(3.1 ± 0.7)(-1)	
	1.98 → 1.62	$(2,3)^- \rightarrow 3^-$	500 ± 80 fs	22.1 ± 0.6	[0]	(3.0 ± 0.5)(-1)	
^{38}Ar	4.48 → 3.81	$4^- \rightarrow 3^-$	2.2 ± 0.6 ps	100	≈ 0	(5.7 ± 1.6)(-2)	
	4.59 → 4.48	$5^- \rightarrow 4^-$	189 ± 3 ps	90.0 ± 1.0	≈ 0	(1.1 ± 0.1)(-1)	
	4.88 → 3.81	$3^- \rightarrow 3^-$	60 ± 20 fs	54 ± 2	≈ 0	(2.3 ± 0.8)(-1)	
	5.16 → 3.94	$2^+ \rightarrow 2^+$	31 ± 9 fs	24 ± 2	[0]	(1.3 ± 0.4)(-1)	
	5.51 → 4.88	$3^- \rightarrow 3^-$	280 ± 50 fs	23 ± 2	[0]	(1.0 ± 0.2)(-1)	
	5.66 → 4.59	$5^- \rightarrow 5^-$	60 ± 15 fs	89.0 ± 0.9	+0.10 ± 0.09	(3.9 ± 1.0)(-1)	
	6.60 → 4.48	$4^- \rightarrow 4^-$	20 ± 6 fs	79.3 ± 1.9	≈ 0	(1.3 ± 0.4)(-1)	
	7.07 → 4.59	$5^- \rightarrow 5^-$	74 ± 20 fs	100	-0.53 ± 0.06	(2.2 ± 0.6)(-2)	
	8.08 → 6.41	$7^+ \rightarrow 6^+$	160 ± 40 fs	100	[0]	(6.5 ± 1.6)(-1)	
^{38}K	0.46 → 0.13	$1^+ \rightarrow 0^+;1$	10.1 ± 0.9 ps	99.04 ± 0.10	0	(8.5 ± 0.8)(-2)	
	1.70 → 0.13	$1^+ \rightarrow 0^+;1$	64 ± 13 fs	100	0	(1.3 ± 0.3)(-1)	
	2.40 → 0.46	$2^+;1 \rightarrow 1^+$	72 ± 17 fs	94 ± 2	≈ 0	(5.4 ± 1.3)(-2)	
^{39}Ar	2.48 → 2.09	$7/2^- \rightarrow 5/2^-$	500 ± 190 fs	17.5 ± 0.6	≈ 0	(1.9 ± 0.7)(-1)	
	2.76 → 0	$5/2^- \rightarrow 7/2^-$	170 ± 60 fs	56.3 ± 1.4	-0.37 ± 0.10	(4.4 ± 1.6)(-3)	
	→ 1.27	$\rightarrow 3/2^-$		43.7 ± 1.4	≈ 0	(2.4 ± 0.7)(-2)	
	3.06 → 2.09	$(5/2,7/2)^- \rightarrow 5/2^-$	150 ± 40 fs	23.5 ± 1.3	[0]	(5.3 ± 1.4)(-2)	
^{39}K	2.52 → 0	$1/2^+ \rightarrow 3/2^+$	75 ± 20 fs	100	±0.69 ± 0.13	(1.8 ± 0.5)(-2)	
	3.60 → 2.81	$9/2^- \rightarrow 7/2^-$	55 ± 2 ps	48 ± 2	-0.59 ± 0.02	(4.2 ± 0.2)(-4)	
	3.944 → 3.60	$11/2^- \rightarrow 9/2^-$	13.0 ± 1.4 ps	37 ± 1	≈ 0	(2.1 ± 0.2)(-2)	
	4.10 → 2.52	$1/2^+ \rightarrow 1/2^+$	80 ± 15 fs	91 ± 2	0	(9.0 ± 1.7)(-2)	
	4.13 → 2.81	$(5/2,7/2)^- \rightarrow 7/2^-$	45 ± 12 fs	100	[0]	(3.0 ± 0.8)(-1)	
	4.52 → 3.60	$9/2^- \rightarrow 9/2^-$	170 ± 45 fs	78 ± 5	[0]	(1.8 ± 0.5)(-1)	
	→ 3.944	$\rightarrow 11/2^-$		22 ± 5	[0]	(2.0 ± 0.7)(-1)	
	4.68 → 4.13	$(5/2,7/2)^- \rightarrow (5/2,7/2)^-$	110 ± 30 fs	18 ± 5	[0]	(3.1 ± 1.2)(-1)	
	5.35 → 3.944	$11/2^- \rightarrow 11/2^-$	165 ± 50 fs	100	-0.2 ± 0.2	(6.5 ± 2.0)(-2)	
	5.50 → 4.68	$(5/2\text{-}9/2)^- \rightarrow (5/2,7/2)^-$	450 ± 180 fs	37 ± 5	[0]	(4.7 ± 2.0)(-2)	
	7.74 → 3.02	$3/2^-;3/2 \rightarrow 3/2^-$	675 ± 200 meV	48	≈ 0	(1.4 ± 0.5)(-1)	
	→ 4.08	$\rightarrow 3/2^-$		12	≈ 0	(8 ± 3)(-2)	
	7.78 → 6.48	$17/2^+ \rightarrow 15/2^+$	19 ± 5 ps	34 ± 8	+0.9 ± 0.3	(1.4 ± 0.7)(-4)	
^{39}Ca	4.02 → 2.47	$1/2^+ \rightarrow 1/2^+$	600 ± 180 fs	80 ± 10	0	(1.1 ± 0.4)(-2)	
^{40}Ar	2.52 → 1.46	$2^+ \rightarrow 2^+$	300 ± 40 fs	59 ± 2	+0.33 ± 0.09	(4.6 ± 0.7)(-2)	
	3.51 → 1.46	$2^+ \rightarrow 2^+$	120 ± 50 fs	89 ± 2	+0.05 ± 0.11	(2.7 ± 1.1)(-2)	42

TABLE X. Strengths of Isospin-Allowed $M1$ Transitions ($M1_{IV}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi;T_i \rightarrow J_f^\pi;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{40}K	0.03 → 0	$3^- \rightarrow 4^-$	6.12 ± 0.12 ns	100	[0]	(1.4 ± 0.1)(-1)	α = 0.37
	0.80 → 0.03	$2^- \rightarrow 3^-$	400 ± 60 fs	100	≈ 0	(1.7 ± 0.3)(-1)	
	0.89 → 0	$5^- \rightarrow 4^-$	1.25 ± 0.20 ps	100	≈ 0	(3.5 ± 0.6)(-2)	
	2.05 → 0.03	$2^- \rightarrow 3^-$	490 ± 60 fs	32 ± 2	≈ 0	(2.5 ± 0.3)(-3)	
	→ 0.80	$\rightarrow 2^-$		39 ± 2	-0.10 ± 0.03	(1.3 ± 0.2)(-2)	
	2.07 → 0	$3^- \rightarrow 4^-$	680 ± 150 fs	38 ± 2	≈ 0	(1.9 ± 0.4)(-3)	
	→ 0.03	$\rightarrow 3^-$		52 ± 2	-0.25 ± 0.08	(2.6 ± 0.6)(-3)	
	→ 0.80	$\rightarrow 2^-$		7 ± 1	+0.15 ± 0.08	(1.6 ± 0.4)(-3)	
	2.290 → 1.64	$1^+ \rightarrow 0^+$	120 ± 20 fs	59 ± 4	0	(5.6 ± 1.1)(-1)	
	→ 1.96	$\rightarrow 2^+$		8 ± 2	[0]	(5.7 ± 1.7)(-1)	
	2.40 → 0.03	$4^- \rightarrow 3^-$	50 ± 20 fs	71 ± 3	-0.25 ± 0.03	(3.1 ± 1.2)(-2)	
	2.63 → 2.10	$(0\text{-}2)^- \rightarrow (1\text{-}3)^-$	310 ± 50 fs	69 ± 3	[0]	(4.7 ± 0.8)(-1)	
	2.88 → 2.54	$6^+ \rightarrow 7^+$	390 ± 140 fs	64 ± 3	≈ 0	(1.3 ± 0.4)(0)	
^{41}Ar	2.40 → 1.35	$1/2^- \rightarrow 3/2^-$	170 ± 50 fs	67 ± 5	[0]	(1.0 ± 0.3)(-1)	
^{41}K	0.98 → 0	$1/2^+ \rightarrow 3/2^+$	5.0 ± 1.5 ps	100	±0.53 ± 0.11	(5.2 ± 1.6)(-3)	
	1.56 → 0	$3/2^+ \rightarrow 3/2^+$	600 ± 110 fs	82.4 ± 0.6	+0.27 ± 0.02	(1.0 ± 0.2)(-2)	
	→ 0.98	$\rightarrow 1/2^+$		17.6 ± 0.6	-0.12 ± 0.04	(4.7 ± 0.9)(-2)	
	1.70 → 0	$5/2^+ \rightarrow 3/2^+$	1.2 ± 0.3 ps	100	+2.1 ± 0.2	(1.0 ± 0.3)(-3)	
	2.32 → 1.29	$5/2^- \rightarrow 7/2^-$	780 ± 210 fs	94.0 ± 0.3	≈ 0	(3.7 ± 1.0)(-2)	
	→ 1.58	$\rightarrow 3/2^-$		6.0 ± 0.3	+0.14 ± 0.07	(5.8 ± 1.6)(-3)	
	2.51 → 1.68	$7/2^+ \rightarrow 7/2^+$	225 ± 85 fs	46.8 ± 1.4	-0.4 ± 0.3	(1.0 ± 0.4)(-1)	
	2.71 → 2.32	$(5/2,7/2)^- \rightarrow 5/2^-$	750 ± 220 fs	13.0 ± 0.5	[0]	(9 ± 3)(-2)	
	2.77 → 2.53	$13/2^+ \rightarrow 11/2^+$	68.5 ± 1.6 ps	100	≈ 0	(3.1 ± 0.1)(-2)	
^{41}Ca	2.46 → 1.94	$3/2^- \rightarrow 3/2^-$	4.5 ± 1.0 ps	100	≈ 0	(4.9 ± 1.1)(-2)	
	2.96 → 0	$7/2^- \rightarrow 7/2^-$	40 ± 10 fs	100	+0.29 ± 0.01	(2.8 ± 0.7)(-2)	
	3.37 → 3.20	$11/2^+ \rightarrow 9/2^+$	29 ± 2 ps	57 ± 1	≈ 0	(1.3 ± 0.1)(-1)	
	3.49 → 2.01	$5/2^+ \rightarrow 3/2^+$	440 ± 100 fs	83 ± 3	+0.14 ± 0.04	(1.8 ± 0.4)(-2)	
	3.68 → 0	$9/2^- \rightarrow 7/2^-$	65 ± 15 fs	94 ± 1	+1.28 ± 0.02	(3.4 ± 0.8)(-3)	
	→ 2.96	$\rightarrow 7/2^-$		6 ± 1	+0.19 ± 0.07	(7 ± 2)(-2)	
	3.91 → 3.37	$13/2^+ \rightarrow 11/2^+$	2.5 ± 0.5 ps	100	≈ 0	(7.9 ± 1.6)(-2)	
	3.98 → 3.20	$11/2^+ \rightarrow 9/2^+$	325 ± 95 fs	82 ± 8	≈ 0	(1.6 ± 0.5)(-1)	
	4.34 → 0	$9/2^- \rightarrow 7/2^-$	185 ± 35 fs	100	-7.3 ± 1.1	(4.1 ± 1.5)(-5)	
^{41}Sc	5.04 → 2.88	$9/2^+ \rightarrow 7/2^+$	240 ± 70 meV	26 ± 2	≈ 0	(2.9 ± 1.0)(-1)	
	5.94 → 3.42	$3/2^+;3/2 \rightarrow 1/2^+$	125 ± 40 meV	18 ± 3	[0]	(7 ± 2)(-2)	
	→ 4.25	$\rightarrow 5/2^+$		60 ± 3	≈ 0	(7 ± 2)(-1)	
^{42}K	0.11 → 0	$3^- \rightarrow 2^-$	410 ± 60 ps	100	≈ 0	(6.2 ± 0.9)(-2)	
	0.26 → 0.11	$4^- \rightarrow 3^-$	190 ± 12 ps	100	≈ 0	(4.7 ± 0.3)(-2)	
	0.70 → 0.26	$5^- \rightarrow 4^-$	59 ± 11 ps	96.4 ± 1.0	-0.102 ± 0.008	(5.9 ± 1.1)(-3)	
^{42}Ca	2.42 → 1.52	$2^+ \rightarrow 2^+$	200 ± 60 fs	70 ± 1	+0.18 ± 0.02	(1.5 ± 0.5)(-1)	
	3.25 → 2.75	$4^+ \rightarrow 4^+$	190 ± 30 fs	35 ± 5	[0]	(4.6 ± 1.0)(-1)	
	3.39 → 1.52	$2^+ \rightarrow 2^+$	190 ± 30 fs	43 ± 4	-1.7 ± 0.4	(2.7 ± 1.1)(-3)	
	3.95 → 3.45	$4^- \rightarrow 3^-$	4.7 ± 0.3 ps	78 ± 6	-0.11 ± 0.05	(3.9 ± 0.5)(-2)	
	4.353 → 3.95	$4^- \rightarrow 4^-$	690 ± 80 fs	9 ± 3	[0]	(6 ± 2)(-2)	
	4.896 → 4.10	$5^- \rightarrow 5^-$	72 ± 20 fs	80 ± 5	-0.14 ± 0.06	(6.7 ± 1.9)(-1)	
	6.14 → 5.49	$6^- \rightarrow 6^-$	70 ± 25 fs	8 ± 3	$+0.25 \pm {}^{0.10}_{0.25}$	(9 ± 4)(-2)	
	6.41 → 6.15	$8^- \rightarrow 7^-$	45 ± 4 ps	16 ± 1	≈ 0	(6.4 ± 0.6)(-3)	
	6.55 → 6.41	$9^- \rightarrow 8^-$	61 ± 4 ps	28 ± 1	≈ 0	(5.2 ± 0.4)(-2)	
^{42}Sc	0.61 → 0	$1^+ \rightarrow 0^+;1$	70 ± 30 fs	100	0	(2.0 ± 0.9)(-0)	
	1.59 → 0.61	$2^+;1 \rightarrow 1^+$	100 ± 30 fs	91 ± 2	[0]	(3.0 ± 0.9)(-1)	
	2.19 → 1.59	$(2,3)^+ \rightarrow 2^+;1$	780 ± 350 fs	100	[0]	(1.9 ± 0.9)(-1)	57
^{42}Ti	2.40 → 1.55	$2^+ \rightarrow 2^+$	330 ± 150 fs	84 ± 3	[0]	(1.2 ± 0.5)(-1)	
^{43}Ca	0.37 → 0	$5/2^- \rightarrow 7/2^-$	48 ± 4 fs	100	+0.192 ± 0.011	(1.3 ± 0.1)(-2)	
	0.59 → 0.37	$3/2^- \rightarrow 5/2^-$	117 ± 6 ps	30 ± 2	+0.10 ± 0.05	(7.6 ± 0.6)(-3)	
	1.39 → 0.99	$5/2^+ \rightarrow 3/2^+$	3.5 ± 1.1 ps	11.7 ± 0.3	-0.32 ± 0.05	(1.5 ± 0.5)(-2)	
	1.90 → 1.39	$7/2^+ \rightarrow 5/2^+$	800 ± 150 fs	17 ± 2	[0]	(5.0 ± 1.1)(-2)	

TABLE X. Strengths of Isospin-Allowed $M1$ Transitions ($M1_{IV}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J^{\pi}_i;T_i \rightarrow J^{\pi}_f;T_f$	τ_m or Γ_γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{43}Ca	3.50 → 2.95	$13/2^+ \rightarrow 11/2^+$	105 ± 35 fs	12 ± 2	≈ 0	(2.1 ± 0.7)(-1)	
	3.94 → 3.37	$15/2^+ \rightarrow 13/2^+$	1.1 ± 0.3 ps	51 ± 7	[0]	(8 ± 2)(-2)	
	→ 3.50	$\rightarrow 13/2^+$		34 ± 7	≈ 0	(1.1 ± 0.4)(-1)	
	4.19 → 3.37	$15/2^+ \rightarrow 13/2^+$	180 ± 70 fs	86 ± 3	+0.15 ± 0.02	(2.7 ± 1.2)(-1)	
	→ 3.50	$\rightarrow 13/2^+$		14 ± 3	[0]	(7 ± 3)(-2)	
	4.59 → 3.94	$17/2^+(13/2^+) \rightarrow 15/2^+$	300 ± 75 fs	49 ± 5	[0]	(2.8 ± 0.8)(-1)	
	→ 4.19	$\rightarrow 15/2^+$		24 ± 5	[0]	(5.7 ± 1.8)(-1)	
^{43}Sc	0.85 → 0	$5/2^- \rightarrow 7/2^-$	330 ± 110 fs	100	-0.16 ± 0.03	(1.5 ± 0.5)(-1)	
	0.88 → 0.15	$5/2^+ \rightarrow 3/2^+$	6.4 ± 0.9 ps	98 ± 1	+0.52 ± 0.07	(9.4 ± 1.3)(-3)	
	1.16 → 0.15	$3/2^+ \rightarrow 3/2^+$	6.4 ± 1.5 ps	54 ± 5	+1.3 ± 0.4	(9 ± 4)(-4)	
	→ 0.86	$\rightarrow 1/2^+$		24 ± 5	-0.2 ± 0.2	(4.1 ± 1.3)(-2)	
	→ 0.88	$\rightarrow 5/2^+$		20 ± 3	-0.2 ± 0.2	(4.3 ± 1.2)(-2)	
	1.18 → 0.47	$3/2^- \rightarrow 3/2^-$	700 ± 200 fs	72 ± 3	+0.18 ± 0.13	(9 ± 3)(-2)	
	→ 0.85	$\rightarrow 5/2^-$		12 ± 2	[0]	(1.4 ± 0.4)(-1)	
	1.34 → 0.88	$7/2^+ \rightarrow 5/2^+$	1.2 ± 0.5 ps	18 ± 2	+0.23 ± 0.04	(5 ± 2)(-2)	
	1.41 → 0	$7/2^- \rightarrow 7/2^-$	290 ± 70 fs	85 ± 2	-0.15 ± 0.04	(3.2 ± 0.8)(-2)	
	→ 0.85	$\rightarrow 5/2^-$		11 ± 2	[0]	(6.8 ± 1.7)(-2)	
	1.65 → 0.15	$5/2^+ \rightarrow 3/2^+$	250 ± 40 fs	56 ± 3	≈ 0	(5.1 ± 0.8)(-2)	
	→ 1.16	$\rightarrow 3/2^+$		20 ± 2	≈ 0	(2.1 ± 0.4)(-1)	
	1.81 → 0.47	$3/2^- \rightarrow 3/2^-$	22 ± 7 fs	35 ± 4	+0.22 ± 0.07	(2.1 ± 0.7)(-1)	
	→ 1.18	$\rightarrow 3/2^-$		39 ± 5	+0.22 ± 0.07	(2.1 ± 0.7)(0)	
	1.93 → 1.34	$9/2^+ \rightarrow 7/2^+$	3.4 ± 0.8 ps	21 ± 7	+0.24 ± 0.04	(9 ± 4)(-3)	
	1.96 → 0.47	$5/2^- \rightarrow 3/2^-$	100 ± 20 fs	84 ± 2	-0.21 ± 0.06	(7.7 ± 1.6)(-2)	
	→ 1.18	$\rightarrow 3/2^-$		13 ± 2	≈ 0	(9 ± 2)(-2)	
	2.09 → 1.18	$3/2^- \rightarrow 3/2^-$	440 ± 100 fs	33 ± 3	≈ 0	(3.1 ± 0.8)(-2)	
	2.55 → 1.93	$(7/2,11/2)^+ \rightarrow 9/2^+$	740 ± 110 fs	61 ± 3	[0]	(1.1 ± 0.2)(-1)	
^{44}Ca	3.04 → 2.28	$4^+ \rightarrow 4^+$	6.7 ± 1.6 ps	51 ± 3	+0.25 ± 0.20	(2.0 ± 0.5)(-2)	
^{44}Sc	0.15 → 0.07	$0^- \rightarrow 1^-$	71 ± 2 μs	99.90 ± 0.03	0	(9.0 ± 0.3)(-7)	
	0.23 → 0.07	$2^- \rightarrow 1^-$	8.8 ± 0.3 ns	31 ± 2	≈ 0	(2.3 ± 0.2)(-4)	
	0.42 → 0.23	$3^- \rightarrow 2^-$	550 ± 60 ps	26 ± 2	≈ 0	(2.2 ± 0.3)(-3)	
	0.67 → 0	$1^+ \rightarrow 2^+$	70 ± 20 fs	100	≈ 0	(1.5 ± 0.6)(0)	
	0.76 → 0	$3^+ \rightarrow 2^+$	310 ± 50 fs	93 ± 2	≈ 0	(2.1 ± 0.3)(-1)	
	1.05 → 0.35	$(3\text{-}5)^+ \rightarrow 4^+$	240 ± 80 fs	100	[0]	(3.8 ± 1.3)(-1)	
	1.19 → 0	$3^+ \rightarrow 2^+$	56 ± 18 fs	40 ± 6	≈ 0	(1.3 ± 0.5)(-1)	
	→ 0.35	$\rightarrow 4^+$		60 ± 6	[0]	(5.7 ± 1.9)(-1)	

TABLE XI. Strengths of Isospin-Retarded $M1$ Transitions ($M1_{IS}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \to E_{xf}$ (MeV)	$J_i^\pi \to J_f^\pi$	τ_m or Γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{10}B	3.59 → 2.15	$2^+ \to 1^+$	147 ± 14 fs	14 ± 2	-0.38 ± 0.09	(8.7 ± 1.6)(-3)	
^{12}C	12.71 → 0	$1^+ \to 0^+$	420 ± 60 meV	84 ± 2	0	(8.1 ± 1.2)(-3)	32
^{14}N	3.95 → 0	$1^+ \to 1^+$	8.5 ± 0.8 fs	3.9 ± 0.2	-2.87 ± 0.16	(2.5 ± 0.4)(-4)	
	5.83 → 5.11	$3^- \to 2^-$	18 ± 2 ps	73	≈ 0	(3.4 ± 0.4)(-3)	
	7.03 → 0	$2^+ \to 1^+$	5.4 ± 0.5 fs	98.8	+0.74 ± 0.09	(1.1 ± 0.1)(-2)	
^{16}O	8.87 → 6.13	$2^- \to 3^-$	180 ± 16 fs	76 ± 2	+1.4 ± 0.4	(2.2 ± 0.8)(-3)	
	[12.53 → 8.87	$2^- \to 2^-$	3.5 ± 0.3 eV	25 ± 3	[0]	(8.3 ± 1.2)(-1)]	T-mixing
^{18}F	2.52 → 0	$2^+ \to 1^+$	680 ± 110 fs	74.9 ± 1.8	+3.5 ± 0.6	(1.6 ± 0.5)(-4)	
	→ 1.70	$\to 1^+$		3.6 ± 0.8	+0.9 ± 0.4	(1.6 ± 0.7)(-3)	
	3.13 → 1.08	$1^- \to 0^-$	310 ± 70 fs	25 ± 2	0	(2.9 ± 0.7)(-3)	
	3.79 → 2.10	$3^- \to 2^-$	225 ± 35 fs	68 ± 4	-0.22 ± 0.06	(1.9 ± 0.3)(-2)	
	3.84 → 0.94	$2^+ \to 3^+$	29 ± 9 fs	8.9 ± 1.4	-0.3 ± 0.3	(3.5 ± 1.3)(-3)	
	5.30 → 0.94	$4^+ \to 3^+$	11 ± 4 meV	9 ± 2	-0.3 ± 0.1	(5 ± 2)(-4)	
^{20}Ne	7.42 → 1.63	$2^+ \to 2^+$	29 ± 4 meV	>90	-8.4 ± 1.3	(1.0 ± 0.3)(-4)	
$^{21}Ne, ^{21}Na$		$5/2_1^+ \to 3/2_1^+$				(1.4 ± 0.4)(-4)	
^{22}Na	0.89 → 0	$4^+ \to 3^+$	15.0 ± 0.4 ps	100	-3.3 ± 0.2	(2.8 ± 0.6)(-4)	
	1.53 → 0.89	$5^+ \to 4^+$	4.9 ± 0.2 ps	6.3 ± 0.3	-2.10 ± 0.13	(2.8 ± 0.3)(-4)	
	3.06 → 0.58	$2^+ \to 1^+$	40 ± 10 fs	15 ± 1	-0.13 ± 0.07	(8 ± 2)(-3)	
	3.52 → 2.57	$3^- \to 2^-$	670 ± 120 fs	5.7 ± 0.4	-2.1 ± 0.3	(5.6 ± 1.6)(-4)	
^{24}Mg	5.24 → 1.37	$3^+ \to 2^+$	110 ± 15 fs	98.2 ± 0.2	+17 ± 4	(1.7 ± 0.8)(-5)	
	7.75 → 0	$1^+ \to 0^+$	18 ± 7 fs	21 ± 2	0	(8 ± 3)(-4)	
	[9.83 → 0	$1^+ \to 0^+$	400 ± 100 as	78 ± 13	0	(6.4 ± 1.9)(-2)]	T-mixing
^{26}Al	2.55 → 0.42	$3^+ \to 3^+$	1.00 ± 0.25 ps	31 ± 2	-1.5 ± 0.4	(3.2 ± 1.5)(-4)	
^{28}Si	6.28 → 1.78	$3^+ \to 2^+$	1.20 ± 0.12 ps	92.5 ± 0.4	-0.14 ± 0.02	(2.6 ± 0.3)(-4)	
	7.80 → 1.78	$3^+ \to 2^+$	260 ± 45 fs	70.0 ± 1.0	$\lvert\delta\rvert<0.5$	(3.4 ± 0.6)(-4)	
	8.33 → 0	$1^+ \to 0^+$	260 ± 110 fs	72 ± 4	0	(1.5 ± 0.6)(-4)	
	8.41 → 6.88	$4^- \to 3^-$	430 ± 90 fs	74 ± 2	-0.17 ± 0.01	(1.5 ± 0.3)(-2)	
$^{29}Si, ^{29}P$		$5/2_1^+ \to 3/2_1^+$				(2.1 ± 0.7)(-3)	
^{30}P	1.45 → 0	$2^+ \to 1^+$	7.6 ± 1.6 ps	95 ± 1	+0.22 ± 0.02	(1.2 ± 0.3)(-3)	
	2.72 → 0	$2^+ \to 1^+$	170 ± 25 fs	100	-3.0 ± 0.4	(9 ± 3)(-4)	
^{32}S	4.70 → 0	$1^+ \to 0^+$	350 ± 50 fs	40 ± 1	0	(3.4 ± 0.5)(-4)	
	→ 2.23	$\to 2^+$		60 ± 1	+0.7 ± 0.4	(2.4 ± 0.9)(-3)	
	6.62 → 5.01	$4^- \to 3^-$	650 ± 100 fs	74 ± 3	-5.7 ± 0.3	(2.6 ± 0.5)(-4)	
	10.232 → 0	$1^+ \to 0^+$	310 meV	7	0	(9 ± 3)(-4)	
	→ 3.78	$\to 0^+$		2	0	(1.1 ± 0.4)(-3)	
^{34}Cl	1.23 → 0.67	$2^+ \to 1^+$	19.7 ± 1.3 ps	37 ± 1	-0.38 ± 0.07	(3.1 ± 0.2)(-3)	
	1.89 → 0.46	$2^+ \to 1^+$	1.7 ± 0.7 ps	60 ± 2	+1.8 ± 0.2	(9 ± 4)(-4)	
	3.98 → 2.72	$3^- \to 2^-$	160 ± 60 fs	8 ± 1	+0.8 ± 0.3	(4.8 ± 1.9)(-3)	
^{36}Ar	5.90 → 4.18	$4^- \to 3^-$	500 ± 200 fs	100	-0.16 ± 0.02	(1.2 ± 0.5)(-2)	
	6.837 → 4.18	$3^- \to 3^-$	240 ± 60 fs	57 ± 5	+1.9 ± 0.5	(9 ± 4)(-4)	
	7.35 → 5.17	$6^- \to 5^-$	180 ± 40 fs	100	+6.0 ± 0.9	(4.5 ± 1.7)(-4)	
$^{39}K, ^{39}Ca$		$1/2_2^+ \to 1/2_1^+$				(1.0 ± 0.4)(-2)	
^{40}Ca	5.61 → 3.74	$4^- \to 3^-$	960 ± 150 fs	72 ± 3	+0.27 ± 0.05	(3.3 ± 0.5)(-3)	
	→ 4.49	$\to 5^-$		28 ± 3	+0.7 ± 0.2	(4.3 ± 1.1)(-3)	
	6.026 → 3.74	$2^- \to 3^-$	220 ± 40 fs	77 ± 3	+2.8 ± 0.5	(1.0 ± 0.4)(-3)	
	6.75 → 3.74	$2^- \to 3^-$	150 ± 35 fs	100	+0.84 ± 0.16	(4.5 ± 1.3)(-3)	
^{44}Ti	[3.65 → 3.18	$2^+ \to 2^+$	3.9 ± 1.3 ps	96 ± 2	[0]	(7 ± 2)(-2)]	J^π uncertain

TABLE XII. Strengths of Isospin-Allowed $M2$ Transitions ($M2_{IV}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \to E_{xf}$ (MeV)	$J_i^\pi;T_i \to J_f^\pi;T_f$	τ_m or Γ	Branching (%)	δ	S (W.u.)	References and Remarks
^{13}C	3.85 → 0	$5/2^+ \to 1/2^-$	12.7 ± 0.3 ps	63.2 ± 0.7	+0.12 ± 0.03	(4.7 ± 0.2)(-1)	47
^{14}C	7.34 → 0	$2^- \to 0^+$	160 ± 60 fs	16 ± 3	0	(3.7 ± 1.6)(-1)	46
^{14}N	5.11 → 2.31	$2^- \to 0^+;1$	12.4 ± 1.4 ps	25	0	(8.8 ± 1.0)(-1)	
	8.91 → 0	$3^-;1 \to 1^+$		from B(M2)		(1.4 ± 0.5)(0)	
^{15}N	5.27 → 0	$5/2^+ \to 1/2^-$	2.6 ± 0.2 ps	100	-0.130 ± 0.006	(6.8 ± 0.5)(-1)	
^{15}O	5.24 → 0	$5/2^+ \to 1/2^-$	3.2 ± 0.5 ps	100	+0.10 ± 0.04	(5.7 ± 0.9)(-1)	
^{16}O	12.97 → 0	$2^-;1 \to 0^+$		from B(M2)		(2.0 ± 0.1)(0)	
^{17}N	2.53 → 0	$5/2^+ \to 1/2^-$	33 ± 3 ps	11 ± 1	≈ 0	(2.1 ± 0.3)(-1)	
^{21}Ne	2.79 → 0.35	$1/2^- \to 5/2^+$	108 ± 13 ps	83.2 ± 0.7	-0.12 ± 0.03	(4.6 ± 0.3)(-1)	52
^{21}Na	2.80 → 0.33	$1/2^- \to 5/2^+$	110 ± 20 μeV	11 ± 4	[0]	(1.1 ± 0.4)(0)	
^{22}Ne	7.66 → 0	$2^- \to 0^+$		from B(M2)		(1.6 ± 0.4)(0)	
^{22}Na	2.57 → 0.66	$2^- \to 0^+;1$	8.1 ± 0.4 ps	1.6 ± 0.3	0	(4.3 ± 0.8)(-1)	
^{29}Si	3.62 → 1.27	$7/2^- \to 3/2^+$	4.2 ± 0.4 ps	2.0 ± 0.5	[0]	(3.0 ± 0.8)(-1)	
^{31}P	9.18 → 0	$3/2^- \to 1/2^+$	290 ± 90 meV	49	-0.088 ± 0.005	(1.1 ± 0.4)(-1)	
	9.29 → 0	$3/2^- \to 1/2^+$	330 ± 100 meV	48	+0.18 ± 0.02	(4.9 ± 1.8)(-1)	
	→ 2.23	$\to 5/2^+$		10	-0.18 ± 0.02	(4.0 ± 1.5)(-1)	
^{32}S	10.08 → 0	$2^-;1 \to 0^+$	1.0 eV	2.0	0	(1.3 ± 0.4)(0)	
^{33}S	2.93 → 0	$7/2^- \to 3/2^+$	41 ± 2 ps	46 ± 2	+0.15 ± 0.02	(1.9 ± 0.1)(-1)	
^{34}S	5.68 → 2.13	$2^- \to 2^+$	380 ± 65 fs	30 ± 3	+0.47 ± 0.09	(1.1 ± 0.4)(0)	
^{35}S	1.99 → 0	$7/2^- \to 3/2^+$	1.47 ± 0.07 ns	100	+0.19 ± 0.08	(8.6 ± 0.4)(-2)	
^{35}Cl	3.16 → 0	$7/2^- \to 3/2^+$	41.8 ± 1.1 ps	90 ± 1	-0.16 ± 0.02	(2.8 ± 0.1)(-1)	
	→ 1.76	$\to 5/2^+$		0.30 ± 0.04	-0.44 ± 0.12	(9 ± 4)(-3)	
	7.80 → 0	$3/2^- \to 3/2^+$	175 ± 50 meV	83	+0.33 ± 0.02	(3.1 ± 1.0)(0)	
	→ 1.22	$\to 1/2^+$		9	-0.21 ± 0.04	(3.4 ± 1.6)(-1)	
^{36}Cl	2.52 → 0.79	$5^- \to 3^+$	2.33 ± 0.11 ns	95.6 ± 0.5	+0.11 ± 0.01	(1.1 ± 0.1)(-1)	
	2.81 → 0.79	$4^- \to 3^+$	4.1 ± 0.8 ps	51 ± 1	+0.14 ± 0.03	(3.0 ± 1.3)(-1)	
	5.313 → 2.52	$7^+ \to 5^-$	29 ± 2 ps	43.8 ± 1.1	≈ 0	(3.6 ± 0.3)(-1)	
	→ 4.29	$\to 6^-$		56.2 ± 1.1	+0.082 ± 0.010	(4.6 ± 1.1)(-1)	
^{37}Cl	3.10 → 0	$7/2^- \to 3/2^+$	22 ± 3 ps	100	-0.18 ± 0.01	(6.0 ± 0.8)(-1)	
^{37}Ar	1.61 → 0	$7/2^- \to 3/2^+$	6.30 ± 0.13 ns	100	+0.12 ± 0.01	(5.7 ± 0.1)(-2)	
	5.21 → 1.61	$11/2^+ \to 7/2^-$	3.6 ± 0.3 ps	9 ± 4	≈ 0	(1.6 ± 0.7)(-1)	
	→ 3.19	$\to 9/2^-$		19 ± 1	+0.08 ± 0.02	(4 ± 2)(-2)	
^{39}Ar	1.52 → 0	$3/2^+ \to 7/2^-$	1.37 ± 0.07 ns	45.9 ± 1.2	-0.20 ± 0.04	(1.5 ± 0.1)(-1)	
^{39}K	2.81 → 0	$7/2^- \to 3/2^+$	68 ± 3 ps	100	-0.17 ± 0.02	(3.1 ± 0.1)(-1)	
^{39}Ca	2.80 → 0	$7/2^- \to 3/2^+$	90 ± 24 ps	100	+0.13 ± 0.07	(2.4 ± 0.6)(-1)	
^{40}K	1.64 → 0.80	$0^+ \to 2^-$	480 ± 10 ns	16 ± 3	0	(3.0 ± 0.6)(-3)	
	1.96 → 0.03	$2^+ \to 3^-$	850 ± 150 fs	19 ± 2	-0.11 ± 0.02	(3.7 ± 1.5)(-1)	
	2.54 → 0.89	$7^+ \to 5^-$	1.56 ± 0.07 ns	88.8 ± 0.4	≈ 0	(1.7 ± 0.1)(-1)	
^{41}K	1.29 → 0	$7/2^- \to 3/2^+$	10.4 ± 0.3 ns	100	-0.118 ± 0.012	(9.8 ± 0.3)(-2)	
^{41}Ca	2.01 → 0	$3/2^+ \to 7/2^-$	670 ± 70 ps	100	-0.13 ± 0.03	(1.6 ± 0.2)(-1)	
	3.37 → 0	$11/2^+ \to 7/2^-$	29 ± 2 ps	43 ± 1	-0.94 ± 0.08	(6.6 ± 0.8)(-2)	
^{42}Ca	6.41 → 3.19	$8^- \to 6^+$	45 ± 4 ps	12 ± 2	-0.8 ± 0.2	(1.7 ± 0.5)(-2)	
^{43}Ca	0.99 → 0	$3/2^+ \to 7/2^-$	71 ± 5 ps	0.28 ± 0.03	[0]	(1.5 ± 0.2)(-1)	
^{43}Sc	0.15 → 0	$3/2^+ \to 7/2^-$	632 ± 8 μs	100	[0]	(6.9 ± 0.1)(-2)	
^{44}Sc	0.15 → 0	$0^- \to 2^+$	71 ± 2 μs	0.10 ± 0.03	0	(7 ± 2)(-4)	

TABLE XIII. Strengths of Isospin-Retarded $M2$ Transitions ($M2_{IS}$)

See page 9 for Explanation of Tables

Nucleus	$E_{xi} \to E_{xf}$ (MeV)	$J_i^\pi \to J_f^\pi$	τ_m	Branching (%)	δ	S (W.u.)	References and Remarks
[^{10}B	5.11 → 0	$2^- \to 3^+$		from B(M2)		(3.5 ± 0.7)(0)]	Poor resolution
^{14}N	5.83 → 0	$3^- \to 1^+$	18 ± 2 ps	27	-1.20 ± 0.25	(6.8 ± 1.8)(-3)	
^{16}O	8.87 → 0	$2^- \to 0^+$	180 ± 16 fs	7.2 ± 0.8	0	(5.0 ± 0.7)(-2)	
[	→ 6.05	$\to 0^+$		0.12 ± 0.03	0	(2.2 ± 0.6)(-1)]	Branching suspect
^{20}Ne	4.97 → 0	$2^- \to 0^+$	4.8 ± 0.5 ps	0.6 ± 0.2	0	(2.4 ± 0.8)(-3)	
	→ 1.63	$\to 2^+$		99.4 ± 0.2	+0.076 ± 0.011	(1.4 ± 0.4)(-2)	
^{22}Na	2.21 → 0	$1^- \to 3^+$	21.5 ± 0.5 ps	2.0 ± 0.4	[0]	(1.0 ± 0.2)(-1)	
	3.52 → 0	$3^- \to 3^+$	670 ± 120 fs	14 ± 3	+0.19 ± 0.03	(8 ± 3)(-2)	
^{28}Si	8.41 → 1.78	$4^- \to 2^+$	430 ± 90 fs	22 ± 2	+2.5 ± 0.2	(2.6 ± 0.7)(-2)	
^{36}Ar	4.97 → 0	$2^- \to 0^+$	14 ± 5 ps	17 ± 2	0	(1.6 ± 0.6)(-2)	

TABLE XIV. Strengths of $M3$ and $M5$ Transitions

See page 9 for Explanation of Tables

Type	Nucleus	$E_{xi} \to E_{xf}$ (MeV)	$J_i^\pi; T_i \to J_i^\pi; T_f$	τ_m	Branching (%)	δ	S (W.u.)	References and Remarks
$M5_{IV}$	^{19}F	2.78 → 0	$9/2^+ \to 1/2^+$		from B(M5)		(6 ± 2)(0)	
$M3_{IV}$	^{24}Na	0.47 → 0	$1^+ \to 4^+$	28.9 ± 0.2 ms	≈ 100	[0]	(8.8 ± 0.1)(0)	
$M3_{IV}$	^{24}Al	0.44 → 0	$1^+ \to 4^+$	187 ± 6 ms	93 ± 2	[0]	(2.2 ± 0.1)(0)	
$M3_{IS}$	^{24}Na, ^{24}Al		$1_1^+ \to 4_1^+$				(5.5 ± 0.2)(-1)	
$M3_{IV}$	^{34}Cl	0.15 → 0	$3^+ \to 0$; 1	46.50 ± 0.20 min	46.9 ± 1.0	0	(6.4 ± 0.1)(-2)	α = 0.18
$M3_{IV}$	^{38}Cl	0.67 → 0	$5^- \to 2^-$	1.032 ± 0.004 s	100	[0]	(1.3 ± 0.1)(-2)	

TABLE XV. Recommended Upper Limits (RUL) for γ-Ray Strengths

See page 9 for Explanation of Tables

Character	Number of cases	RUL (W.u.)	Character	Number of cases	RUL (W.u.)
E0	21		$M1_{IV}$	694	10
$E1_{IV}$ A = 6 - 20	139	0.3	$M1_{IS}$	44	0.03
$E1_{IV}$ A = 21 - 44	567	0.1	$M2_{IV}$	45	3
$E1_{IS}$	136	0.003	$M2_{IS}$	8	0.1
$E2_{IS}$	674	100	$M3_{IV}$	4	10
$E2_{IV}$	21	10	$M3_{IS}$	1	
E3	53	100	M5	1	
E4	10	100			
E5	2				