

ON THE PAIRING FACTORS FOR ELECTRIC TRANSITION OPERATORS:

A comment on the preceding paper

P. J. BRUSSAARD

Fysisch Laboratorium, Rijksuniversiteit, Utrecht

Received April 1971

The Editors have extended the courtesy of my making a short correction/reply to the paper of Allaart ¹). Since it would not be in the proper spirit to engage in a polemic, let me simply note a few relevant points.

(i) I regret mentioning Siegert's theorem; it was in the nature of an aside in the concluding remarks ²). The relevant sentence is too vague for a well-defined discussion. However, Siegert's theorem is not central to the paper (no allusions to Siegert's theorem are made in the main text).

(ii) The key point of my paper was to discuss Bohr and Mottelson's ³) (coordinate free) parameter c for the description of electromagnetic transition operators. That discussion, I believe, is correct and is certainly independent of Siegert's theorem. A coordinate free treatment is advantageous in avoiding spurious dependence on special phase conventions.

(iii) Siegert's theorem is not without its own controversial aspects. Many of the texts commonly referred to are misleading, if not incorrect. (See the discussion ⁴) organized by Professor B. Bosco at the NATO Summer School at Cagliari in September 1970.)

(iv) There is, however, a serious criticism of our application to the BCS model. This concerns the fact that the commutator $[\rho, H]$ in general will not lead to a *single-particle* operator, contrary to the implicit assumption in our application of the parameter c . In particular the non-local character of the pairing interaction of the BCS model might be incompatible with this assumption.

(v) The right-hand side of eq. (5.2a) should contain a factor $(1 + \delta_{ab})^{-\frac{1}{2}}$ in order that normalized states be obtained.

The author is indebted to Drs. L. C. Biedenharn, R. Y. Cusson and A. E. L. Dieperink for helpful discussions.

References

- 1) K. Allaart, Nucl. Phys. A174 (1971) 545
- 2) P. J. Brussaard, Nucl. Phys. A158 (1970) 440
- 3) A. Bohr and B. R. Mottelson, Nuclear structure, vol. 1 (Benjamin, New York and Amsterdam, 1969) eqs. (1A-81) and (3.13)
- 4) Proc. of the NATO Summer School at Cagliari (Sardinia), September 1970 (Gordon and Breach, New York, 1971)