

Is it possible to test Interacting Boson Approximation?

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In a recent paper¹⁾ the most detailed test up to date of the interacting boson model (IBM) is claimed. Previously IBM has been applied to a large number of nuclei with widely varying structure and the agreements with the data were interpreted as the experimental tests of IBM^{2,3)}. On the other hand, the underlying SU(6) group structure of IBM leads to three limiting symmetries, SU(5), SU(3) and O(6), which correspond to the conventional vibrational, rotational (with degenerate β_2 - and γ -bands) and γ -unstable nuclei, respectively. It is claimed that these features distinguish IBM from other models^{2,3)}.

Such claims are not justified, because IBM is equivalent to a particular type of the quadrupole phonon model, the SU(6) quadrupole phonon model⁴⁾, which is referred to as TQM. This equivalence holds both on the level of matrix elements and on the level of operators^{5,6,7)}. Thus, any spectrum or electromagnetic property obtained in IBM, for example those of ref.¹⁾, can be equally well interpreted as a piece of evidence for the quadrupole phonon model TQM. IBM is simply embedded in the quadrupole phonon model.

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