

A close look at $Q(2_1^+)/ (B(E2; 0_1^+ \rightarrow 2_1^+))^{1/2}$ in even-even nuclei.

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A survey was carried out of even-even nuclei in the periodic table for which independent measurements of both the quadrupole moment of the 2_1^+ state, and the reduced transition probability $B(E2; 0_1^+ \rightarrow 2_1^+)$ exist and their ratio studied. As predicted by the rotational model, this ratio was found to be about 1 for the deformed nuclei in the rare - earth region. For non - rotational nuclei the absolute value of this ratio is almost always considerably less than unity, usually near 0.5. This latter observation can be interpreted within different models for different classes of nuclei as illustrated by a set of schematic IBA model calculations. A general mixing model and simple geometrical models are also suitable for collective non-rotational nuclei. Near magic nuclei, a mechanism for small values of the ratio is qualitatively discussed in terms of the seniority scheme.

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