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Projected total energy surface description for axial shape
asymmetry in even-even nuclei

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The projected total energy surface (PTES) approach has been developed based on the triaxial projected shell model (TPSM) hybridized with the macroscopic–microscopic method. The total energy of an atomic nucleus is decomposed into macroscopic, microscopic and rotational terms. The macroscopic and microscopic components are described with the liquid drop model and Strutinsky method, respectively, and the rotational energy is given by the TPSM, the term beyond the mean field. To test theory, the PTES calculations have been carried out for the yrast states of the well deformed rare earth nuclei W, and the theoretical results are in good agreement with the experimental data. By using the equilibrium quardrupole deformations determined by the PTES, the calculation of the transition quardrupole moment (Qt) in function of spin also reproduces the experimental data. A comparison between the PTES and TRS methods has been made for theoretical and application uses.

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