Azimuthal angle dependence of the Coulomb barrier parameters for the interaction between two deformed nuclei

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Abstract

The azimuthal angle ( ) dependence of the Coulomb barrier parameters (height V_b and position R_b) are studied in the framework of the double-folding model with the realistic M3Y nucleon-nucleon interaction. Different pairs of axially symmetric, deformed nuclei are considered. For the interaction between medium and heavy nuclei, the maximum percentage of dependence is studied as a function of relative orientations of the interacting nuclei. It appreciably increases as the values of the deformation parameters increase and is sensitive to the hexadecapole deformation. The smallest variation is found for the relative orientations $_P = _T = 90°$. The variation of the Coulomb barrier parameters, as calculated in the present paper, is completely different in both magnitude and behavior from those deduced in the widely used proximity approach.