

## Orientation dependence of the heavy-ion potential between two deformed nuclei

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### Abstract:

The deformation and orientation dependence of the real part of the interaction potential is studied for two heavy deformed nuclei using the Hamiltonian energy density approach derived from the well-known Skyrme  $NN$  interaction with two parameter sets SIII and SkM\*. We studied the real part of the heavy ion (HI) potential for  $^{238}\text{U}+^{238}\text{U}$  pair considering quadrupole and hexadecapole deformations in both nuclei and taking into consideration all the possible orientations, coplanar and noncoplanar, of the two interacting nuclei. We found strong orientation dependence for the physically significant region of the HI potential. The orientation dependence increases with adding the hexadecapole deformation. The azimuthal angle dependence is found to be strong for some orientations. This shows that taking the two system axes in one plane produces a large error in calculating **the physical quantities.**

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