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Study of surface and volume coefficients of the nuclear symmetry energy

Nuclear symmetry energy plays a key role in both nuclear physics and nuclear astrophysics. It is important to studying the equation of state of neutron star matter and also estimating the core-crust interface density. In order to calculate symmetry energy we have used the lowest-order constrained variational (LOCV) method. In this work, the volume(a_AˆV) and surface(a_AˆS) components of the nuclear symmetry energy and their ratio(⊠κ=a⊠_AˆV/a_AˆS) obtained for the Zr, Mo, and Sn isotopic chains. Our results for the values of the ratio ,κ, are about the range of 0.3 ≤ ⊠ ≤ 1.3, 0.4 ≤ ⊠ ≤ 1.6 and 0.3 ≤ ⊠ ≤ 0.7 respectively. The symmetry energy s for finite nuclei is obtained to be infinite superposition of the corresponding asymmetric nuclear matter (ANM) symmetry energy for each isotopic chains. The results are compared with experimental data and also with those of other theoretical methods.

Keywords: LOCV method, volume and surface components of symmetry energy

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