

Finite nuclei size effects in elasticity of neutron star inner crust

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When considering elasticity in terrestrial conditions, one can safely neglect the nuclear size and treat nuclei as point charges, which create the electrostatic potential for electrons. However, it is not the case for the deepest layers of neutron star inner crust, where the distance between nuclei becomes of the same order as their sizes (e.g. [1,2]). In these conditions, the electrostatic potential, induced by nearby nuclei and electrons, can affect nuclei shape and indeed, the most energetically favorable shape of nuclei can substantially differ from spherical one (so-called pasta-phases in the mantle region) [1,2]. Here we analyze the elasticity of the matter under these conditions. In comparison with [3], we consider not only the mantle region but also spherical nuclei of the deepest layers of the inner crust. We also take into account neutron skin as well as the fact that nucleon number density can be affected by deformation. The latter effect decreases elastic energy.

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The speaker is a student or young scientist

No

Section

1. Neutrino physics and nuclear astrophysics

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