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Softening of the Nuclear Matter and the Maximum Mass of the Neutron Star

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The equation of state (EOS) of the nuclear matter containing nucleons, leptons, and hyperons as relevant degrees of freedom is calculated in the framework of the free Fermi gas model at zero temperature. The system is supposed to be an uncharged mixture of mentioned particles which are in beta-equilibrium. The threshold density of each particle is determined in such matter. We find that the appearance of each new particle in the system results in softening the EOS. The equilibrium structure of the neutron star described by discussed EOS is also studied in the present article.

Author: KH NIAKIAN, huni (University of Tehran)

Presenter: KH NIAKIAN, huni (University of Tehran)