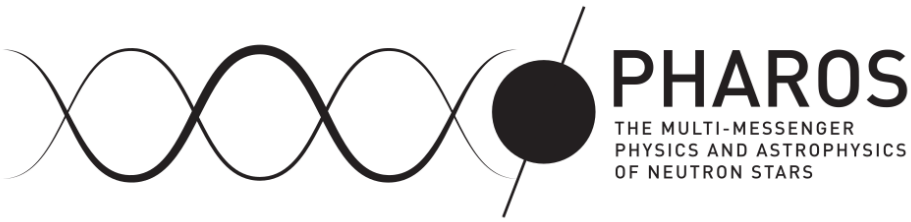

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Probing the neutron stars interior within the realistic equation of state with induced surface tension

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We apply the novel equation of state, which includes the surface tension contribution induced by the interparticle interaction and the asymmetry between neutrons and protons, to the study of neutron star properties. This high-quality equation of state is obtained from the virial expansion for the multicomponent particle mixtures that takes into account the hard-core repulsion between them. The considered model is in full concordance with all the known properties of normal nuclear matter, provides a high quality description of the proton flow constraints, hadron multiplicities created during the nuclear-nuclear collision experiments and equally is consistent with astrophysical data coming from neutron star observations. The analysis suggests that the best model parametrisation gives the incompressibility factor K0, symmetry energy J and symmetry energy slope L at normal nuclear density equal to 200 MeV, 30 MeV, and 113.28–114.91 MeV, respectively. The found mass-radius relation for neutron stars computed with this equation of state is consistent with astrophysical observations.

Primary authors: Dr SAGUN, Violetta (Centro Multidisciplinar de Astrofisica/BITP); Prof. LOPES, Ilidio (Center for Astrophysics and Gravitation, IST); Dr IVANYTSKYI, Oleksii (Bogolyubov Institute for Theoretical Physics)

Presenter: Dr SAGUN, Violetta (Centro Multidisciplinar de Astrofisica/BITP)