Contribution ID : **27** Type : **not specified**

Equation of state of neutron stars consistent with astrophysical, low- and high- energy nuclear physics data and its applications

We apply the novel equation of state, which includes the surface tension contribution induced by the inter-particle interaction and the asymmetry between neutrons and protons, to the study of neutron star properties. This 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 and GW170817 merger. The found mass-radius relation for neutron stars computed with this equation of state is consistent with astrophysical observations. This talk will show how the induced surface tension (IST) equation of state opens an elegant way to describe the properties of matter across a very wide range of densities and temperatures.

Within the IST EoS we have studied radial oscillations of six stars with different masses and radii. We will present the detailed analysis how the changes of thermodynamic properties of the matter leave an imprint on star oscillations.

Primary author(s) : Dr SAGUN, Violetta (CENTRA, Instituto Superior Técnico)

Co-author(s) : PANOTOPOULOS, Grigorios (CENTRA, Instituto Superior Técnico); LOPES, Ilidio (CENTRA, Instituto Superior Técnico); ALEKSEI, Ivanytskyi (University of Salamanca/Bogolyubov Institute for Theoretical Physics)

Presenter(s) : Dr SAGUN, Violetta (CENTRA, Instituto Superior Técnico)