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How the bulk properties of nuclear matter influence neutron star observables?

Description of dense nuclear matter rely on the experimental constraints
coming from the properties of “normal” nuclear matter found in nuclei and
observational data from neutron stars which consist of ultra dense nuclear matter.
In this presentation I show how the parameters of nuclear matter (effective nucleon mass, compressibility, and proton neutron asymmetry) influence the properties of neutron stars by using multiple Walecka type models with different scalar self interaction terms.
In relativistic mean field theories of nuclear matter the values of the Landau mass and nucleon effective mass are not independent hence they can not be fitted in a given model simultaneously, which gives at least two different parametrization of the same model.
The effect of this ambiguity on neutron star observable is studied by solving The Tollmann-Oppenheimer-Volkov equations using these different parametrizations. The sensitivity of the M-R diagram to different parametrizations of a given model is also
studied especially in the case of maximum mass neutron stars.

Primary author(s) : Mr PÓSFAY, Péter (Wigner Researc Centre for Physics)

Co-author(s) : Dr JAKOVÁC, Antal (Eötvös Loránd University Budapest); Dr BARNAFÖLDI, Gergey (Wigner Research Centre for Physics)

Presenter(s) : Mr PÓSFAY, Péter (Wigner Researc Centre for Physics)