Contribution ID: 6

Type: not specified

## Nearly model-independent constraints on dense matter equation of state in a Bayesian approach

We apply the Bayesian approach to construct a large number of minimally constrained equations of state (EOSs) and study their correlations with a few selected properties of a neutron star (NS). Our set of minimal constraints includes a few basic properties of saturated nuclear matter and low-density pure neutron matter EOS, which is obtained from a precise next-to-next-to-next-to-leading-order (N<sup>3</sup>LO) calculation in chiral effective field theory. The tidal deformability and radius of NS with mass  $1 - 2M_{\odot}$  are found to be strongly correlated with the pressure of  $\beta$ -equilibrated matter at densities higher than the saturation density ( $\rho_0 = 0.16 \text{ fm}^{-3}$ ) in a nearly model-independent manner. These correlations are employed to parametrize the pressure for  $\beta$ -equilibrated matter, around  $2\rho_0$ , as a function of neutron star mass and the corresponding tidal deformability. The maximum mass of a neutron star is also found to be strongly correlated with the pressure of  $\beta$ -equilibrated matter at densities of  $\beta$ -equilibrated matter at densities for  $\beta$ -equilibrated matter at densities for  $\beta$ -equilibrated matter at densities and the corresponding tidal deformability. The maximum mass of a neutron star is also found to be strongly correlated with the pressure of  $\beta$ -equilibrated matter at densities  $\sim 4.5\rho_0$ .

**Authors:** Prof. MUKHERJEE, Arunava (Saha Institute of Nuclear Physics, 1/AF Bidhannagar, Kolkata 700064, India.); Prof. AGRAWAL, B. K. (Saha Institute of Nuclear Physics, 1/AF Bidhannagar, Kolkata 700064, India.); PATRA, N. K.; Mr IMAM, Sk Md Adil (Saha Institute of Nuclear Physics, 1/AF Bidhannagar, Kolkata 700064, India.); Dr MALIK, Tuhin (CFisUC, Department of Physics, University of Coimbra, 3004-516 Coimbra, Portugal)

**Presenter:** PATRA, N. K.