

The Nuclear Equation of State from Experiments and Astrophysical observations*

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An equation of state of nuclear matter relates states observables such as energy, pressure, temperature and density. The nuclear equation of state is important in determining the existence and properties of nuclei as well as complex astrophysical objects such as neutron stars. Even though nuclei and neutron stars differ in sizes by 18 orders of magnitude and the maximum density for each object differs by one order of magnitude, they are governed by the same equation of state. Recent advances in astrophysics observations of gravitational waves from neutron star mergers from LIGO/VIRGO as well as radii measurements from NICER allow us to combine these data with those from nuclear structure and nuclear reaction experiments. In the talk, I will present an improved understanding of the Equation of State of neutron rich matter as well as neutron star matter using Bayesian analysis applied to the combined astrophysical and terrestrial constraints.

This work is supported in part by the U.S. Department of Energy (Office of Science) under Grant Nos. DESC0014530.