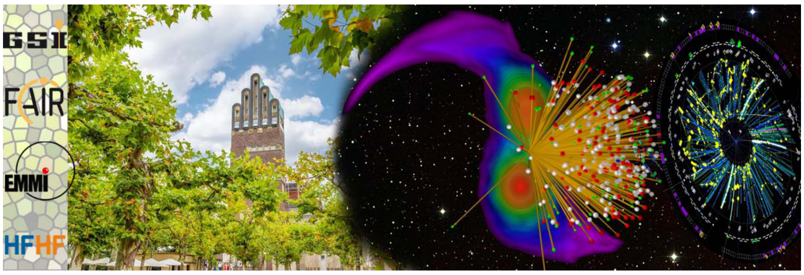

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Inferring the symmetry energy by combining nuclear and astrophysical data using a consistent model of nuclear matter

Thursday, September 21, 2023 5:00 PM (25 minutes)

We have entered the era of multi-messenger nuclear astrophysics; bringing a host of astrophysical observations and nuclear experimental data to collectively measure the properties of neutron star matter and the nuclear force in neutron-rich systems. In order to combine disparate data sets with meaningful uncertainty quantification, over the past decade the statistical inference techniques employing ensembles of models of each observable have been increasingly employed. In order to minimize systematic model uncertainty, where possible the same underlying model should be used to construct neutron star and nuclear models. We present an example of such an approach, using an Energy-Density Functional to model bulk properties of neutron stars such as the maximum mass, radii, tidal deformabilities and moments of inertia, crust properties of neutron stars, and nuclear properties including nuclear masses, neutron skins and dipole polarizabilities. We demonstrate how different observables constrain the symmetry energy in different density ranges, and discuss some of the remaining model uncertainties.

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