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Microscopic equation of state constraints and Bayesian uncertainty quantification

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In recent years, significant advances have been made in constraining the dense matter equation of state (EOS) from, e.g., multi-messenger astronomy, chiral effective field theory (EFT), novel experimental campaigns such as PREX-II and CREX, and heavy-ion collisions. However, many key questions remain, especially regarding the composition and EOS of the dense matter in the inner cores of heavy neutron stars.

In this talk, I will review recent advances in microscopic nuclear matter calculations with chiral two- and three-nucleon interactions and Bayesian methods for rigorous uncertainty quantification. Benchmarks of chiral EFT in terms of empirical saturation properties and their implications for the nuclear symmetry energy and density dependence will be discussed. I will also demonstrate the efficacy of Bayesian model mixing (BMM) in combining EOS predictions from chiral EFT at low and perturbative QCD at very high densities to construct globally predictive, microscopic EOS models that cover all densities probed by neutron stars.

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Classification de Session: Theoretical (microscopic) calculations of neutron rich dense nuclear matter

Classification de thématique: Microscopic calculations of neutron-rich dense nuclear matter