

Abstract Submitted  
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**Recent advances in microscopic approaches to neutron-rich matter**<sup>1</sup> FRANCESCA SAMMARRUCA, University of Idaho — Nuclear matter is a convenient theoretical laboratory to test many-body theories. When neutron and proton densities are different, the isospin dependence of the nuclear force gives rise to the symmetry energy term in the equation of state. This quantity plays a fundamental role in a broad spectrum of systems and phenomena, including: the skins of neutron-rich nuclei, the location of the neutron drip lines, and the structure of compact stars. From the theoretical standpoint, microscopic calculations with statistically meaningful uncertainties are essential to guide experiments. In recent years, chiral effective field theory has become popular because of its firm connection with quantum chromodynamics and its systematic approach to the development of nuclear forces. We will report on recent calculations of the nuclear and neutron matter equations of state<sup>1</sup> at different orders of the chiral expansion as well as changing resolution scale. We will present applications and discuss the significance of those predictions as a foundation for future studies of convergence of the chiral perturbation series.

1. F. Sammarruca, L. Coraggio, J.W. Holt, N. Itaco, R. Machleidt, and L.E. Marcucci, *Phys. Rev. C* **91**, 054311 (2015).

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