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Predicting neutron star properties based on chiral effective field theory[1] ALISON LADUKE, FRANCESCA SAMMARRUCA, University of Idaho — The energy per nucleon as a function of density, known as the nuclear equation of state, is the crucial input in the structure equations of neutron stars and thus establishes the connection between nuclear physics and compact astrophysical objects. More precisely, the pressure which supports the star against gravitational collapse is mostly determined by the nature of the equation of state of highly neutron-rich matter. In this contribution, we will report on our work in progress to calculate neutron star masses and radii. The equation of state is obtained microscopically from Brueckner-Hartree-Fock calculations based on state-of-the-art nuclear forces which have been developed within the framework of chiral effective field theory. The latter has become popular in recent years as a fundamental and systematic approach firmly connected to low-energy quantum chromodynamics.

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