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Abstract for an Invited Paper
for the APR11 Meeting of
the American Physical Society

Hans A. Bethe Prize Talk: Neutron stars and stellar collapse: the physics of strongly interacting Fermi systems

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The talk will touch on a number of themes in the application of many-body theory to neutron stars and stellar collapse. One of these will be the composition and equation of state of nuclear matter. Specific topics will include nuclei in neutron stars, superfluidity and superconductivity of nuclear matter, and inhomogeneous phases of nuclear matter. A second major theme will be neutrino processes in dense matter: neutrino emission is the most powerful cooling mechanism for young neutron stars, and rates of neutrino processes are a key ingredient in simulations of stellar collapse.