Abstract Submitted
for the HAW14 Meeting of
The American Physical Society

Strangeness in neutron star matter: a challenging puzzle[1] DIEGO LONARDONI, ALESSANDRO LOVATO, Argonne Natl Lab, STEFANO GANDOLFI, Los Alamos Natl Lab, FRANCESCO PEDERIVA, INFN-TIFPA and University of Trento — The onset of strange baryons in the core of neutron stars and the consequent softening of the equation of state have been questioned for a long time. Controversial theoretical predictions about the predicted maximum mass and the recent astrophysical observations are the grounds of the so called *hyperon puzzle*. We attempt to give our contribution to the discussion by studying the general problem of the hyperon-nucleon interaction by means of Auxiliary Field Diffusion Monte Carlo calculations. We employ a phenomenological approach showing that a three-body hyperon-nucleon force provides the strong repulsive contribution needed to correctly describe the systematics of medium-light Λ hypernuclei. The same potential has been used to determine the equation of state and the mass-radius relation of an infinite systems of neutrons and Λ particles. We find that the three-body hyperon-nucleon force has a dramatic effect on the equation of state and the predicted maximum mass. Our results suggest that more constraints on the nature of hyperon-neutron forces are needed before drawing any conclusion on the role played by hyperons in neutron stars.

[1]D. Lonardoni is supported by the U.S. Department of Energy, Office of Nuclear Physics, under the NUCLEI SciDAC-3 grant.

Diego Lonardoni
Argonne Natl Lab

Date submitted: 27 Jun 2014 Electronic form version 1.4