Abstract Submitted
for the APR15 Meeting of
The American Physical Society

Searching for isovector signatures in the neutron-rich oxygen and calcium isotopes WEI-CHIA CHEN, JORGE PIEKAREWICZ, Florida State University — We search for potential isovector signatures in the neutron-rich oxygen and calcium isotopes within the framework of a relativistic mean-field theory with an exact treatment of pairing correlations. To probe the isovector sector we calibrate a few relativistic density functionals using the same isoscalar constraints but with one differing isovector assumption. It is found that under certain conditions, the isotopic chain in oxygen can be made to terminate at the experimentally observed ^{24}O isotope. In the case of the calcium isotopes, the drip line is predicted to be reached beyond ^{60}Ca. To produce such behavior, the resulting symmetry energy must be soft, with predicted values for the symmetry energy and its slope at saturation density being $J = (30.92 \pm 0.47)$ MeV and $L = (51.0 \pm 1.5)$ MeV, respectively. As a consequence, the neutron-skin thickness of ^{208}Pb is rather small: $R_{\rm skin}^{208} = (0.161 \pm 0.011)$ fm. This same model, labelled *FSUGarnet*, predicts $R_{1.4} = (13.1 \pm 0.1)$ km for the radius of a "canonical" $1.4M_{\odot}$ neutron star, yet is also able to support a two-solar-mass neutron star.

Wei-Chia Chen
Florida State University

Date submitted: 07 Jan 2015 Electronic form version 1.4