Abstract Submitted
for the APR11 Meeting of
The American Physical Society

**Off-Fermi Shell Nucleons in Superdense Nuclear Matter**
MICHAEL MCGAULEY, Miami Dade College, MISAK SARGSIAN, Florida International University — Based on recent progress in understanding the nature of two-nucleon short range correlations we performed analysis of world data on inclusive electro-nuclear reactions at large momentum transfer. The analysis allowed us to extract the probabilities of two-nucleon short range correlations for He-3, He-4, C-12, Al-27, Fe-56 and Au-197. Using recent observations on strong dominance of proton-neutron short-range correlations as compared to proton-proton and neutron-neutron correlations we parameterized the obtained probabilities as a function of nuclear density and asymmetry. Using the obtained functional form of the probabilities we estimated the fraction of off-Fermi shell protons and neutrons in the superdense nuclear matter relevant to neutron stars. Our results indicate that starting at 3-4 nuclear saturation densities the protons with fractional densities Xp = 1/9 will populate mostly the high momentum (off-Fermi shell) tail of the momentum distribution while only 20% of the neutrons will be in the high momentum tail. We discuss the implication of our observation on several properties of neutron star cores such as stiffness, phase transitions, cooling, superfluidity and magnetization.

Michael McGauley
Miami Dade College

Date submitted: 12 Jan 2011 Electronic form version 1.4