Abstract Submitted
for the DNP07 Meeting of
The American Physical Society

**Determining the Density Dependence of the Nuclear Symmetry Energy and Its Impacts in Astrophysics with Heavy-Ion Reactions** LIE-WEN CHEN, WEI-ZHOU JIANG, PLAMEN KRASTEV, Texas A&M University-Commerce, ANDREW STEINER, Michigan State University, AARON WORLEY, Texas A&M University-Commerce, JUN XU, Shanghai Jiao-Tung University, GAO-CHAN YONG, Texas A&M University-Commerce — The density dependence of the nuclear symmetry energy is important for both nuclear physics and astrophysics. Recent data on isospin transport in heavy-ion reactions have allowed us to constrain significantly the symmetry energy at sub-saturation densities. In this talk we discuss promising probes of the symmetry energy at supra-normal densities using heavy-ion reactions induced by high energy radioactive beams. Astrophysical impacts of the constrained symmetry energy on cooling mechanisms and mass-radius correlations of neutron stars as well as the changing rate of the gravitational "constant G" will also be discussed.

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Date submitted: 03 Jul 2007 Electronic form version 1.4