Contribution ID: **7** Type: **not specified**

Proto-Neutron Star Winds with Magnetic Fields and Rotation

Friday, 16 July 2010 12:00 (30 minutes)

Core collapse supernovae have long been considered one of the most promising astrophysical sites for r-process nucleosynthesis. Detailed calculations of the neutrino-heated winds from proto-neutron stars, however, find that the ratio of neutrons to seed nuclei is generally too low for the r-process to reach the second or third abundance peaks. Success instead appears to require some combination of lower electron fraction, higher entropy, or more rapid expansion. Although most calculations to date consider slowly rotating, non-magnetized neutron stars, it is now clear that highly magnetized neutron stars ("magnetars") are fairly common and that rapid rotation may be a key ingredient in their formation. I will present one-dimensional MHD calculations of the neutrino-heated winds from magnetized rotating proto-neutron stars. I will use these results to describe how strong magnetic fields and rapid rotation alter the wind conditions (electron fraction, entropy, dynamical timescale) necessary for a successful r-process.

Primary author: Dr METZGER, Brian (Princeton University)

Co-authors: Dr QUATAERT, Eliot (University of California, Berkeley); Dr THOMPSON, Todd (The Ohio State University)

Presenter: Dr METZGER, Brian (Princeton University)

Session Classification: Session 4: The r-process in core-collapse supernovae I