

Quark matter in core-collapse supernovae

Ms. Johanna Pokie-Olson
Graduate Student
University of Notre Dame

Tuesday, September 24 ♦ 12:30 P.M.
Room 184 Nieuwland Science Hall

Recent studies have shown that a transition to a quark-gluon plasma during a core-collapse supernovae could provide a mechanism to revitalize a stalled accretion shock. An Equation of State (EoS) to describe the properties of matter in extremes of density and temperature allows us to incorporate these phases of matter in simulation.

I will discuss the effects of a phase transition to quark-gluon matter in the new Notre Dame Livermore Equation of State (NDL EoS). I demonstrate the consequences of varying the QCD bag constant and the strong coupling constant on the mass-radius relationship. The observation of a 1.97 ± 0.04 solar mass neutron star provides a stringent limit on the parameter space of a quark-gluon plasma phase in simulating supernovae collapse.