Nuclear Physics Seminar

On the Evolution of Weak Nuclear Statistical Equilibrium

MONDAY

NOVEMBER 9

4:00 P.M.

RM 124 NSH

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Nuclear reaction networks are collections of nuclei and reactions among them. In high temperature and high density environments in stellar explosions, the nuclear reactions in these networks operate on different timescales. In particular, the strong and electromagnetic reactions are typically much faster than the weak reactions. This means that the network can achieve nuclear statistical equilibrium (NSE), which is an equilibrium with respect to the strong and electromagnetic reactions, much more quickly than it achieves weak nuclear statistical equilibrium (WSE), which is a full equilibrium under all reactions, including weak reactions. In this talk, I will explore the transition from NSE to WSE and will discuss consequences for astronomical displays from core-collapse supernovae and for isotopic anomalies in primitive solar system condensates.