

Abstract Submitted  
for the APR13 Meeting of  
The American Physical Society

**Progenitor Dependence of the Early Neutrino Signal in Core-Collapse Supernova** EVAN O’CONNOR, Canadian Institute for Theoretical Astrophysics, CHRISTIAN OTT, California Institute of Technology — Not all massive stars are destroyed equally. This is especially true when discussing the early neutrino signal from a core-collapse supernovae. In this talk, I will present the results of a study in which we simulated the preexplosion neutrino emission from 32 progenitor stars ranging in mass from 12 to 120 solar masses. The neutrino signal up to the time of explosion (during the accretion phase) carries definite information pertaining to the presupernova stellar structure. To quantify this information, we classify the presupernova models according to their “compactness.” In the 32 model we simulated, the magnitude of the neutrino luminosity during the accretion phase varies by over a factor of 4 between models and, as I will show, is directly proportional to the compactness parameter. With the current generation of neutrino detectors, the electron anti-neutrino signal from the next galactic core-collapse supernova will tell us direct and detailed information on the progenitor core structure, aiding in our modelling of the evolution of massive stars.

Evan O’Connor  
Canadian Institute for Theoretical Astrophysics

Date submitted: 14 Jan 2013

Electronic form version 1.4