Abstract Submitted for the APR13 Meeting of The American Physical Society

Impact of Sterile Neutrinos on Core-Collapse Supernovae¹ MACKENZIE WARREN, MATTHEW MEIXNER, GRANT MATHEWS, University of Notre Dame, J. HIDAKA, T. KAJINO, NAOJ — Despite significant advancements in modeling core-collapse supernovae, there are still phenomena that we do not understand. The existence of a heavy right-handed sterile neutrino may provide a means of solving some of the issues related to the lepton fraction, neutrino spectrum and energy transport within the collapsing core. Recent anomalous reactor results and cosmological constraints provide some bounds on the sterile neutrino mass m_s and mixing angle $\sin^2 2\theta_s$. We have included the effects of a coherent active-sterile conversion for a \sim keV mass sterile neutrino, including matter effects through the MSW mechanism, into a self-consistent supernova model. Preliminary results show that a few milliseconds prior to the core bounce there is a coherent conversion of electron neutrinos to sterile neutrinos, which alters the neutrino spectrum and dynamics of the collapse.

¹Work at the University of Notre Dame is supported by the U.S. Department of Energy under Nuclear Theory Grant DE-FG02-95-ER40934.

MacKenzie Warren University of Notre Dame

Date submitted: 11 Jan 2013 Electronic form version 1.4