Abstract Submitted
for the APR14 Meeting of
The American Physical Society

Total Energy Due to Pair Production by Neutrinos in Type II Supernovae[1] ANNA REINE, TODD TINSLEY, Hendrix College — While neutrinos carry the vast majority of energy in type II supernovae explosions, some neutrino interactions only permitted because of the presence of strong magnetic fields are not typically considered in models of supernova collapse and explosion. Our research explored the impact of one such interaction on spherically symmetrical models, which, unlike the more complex magnetohydrodynamic models, do not account for enough energy to explain the explosion. We created a model to determine the order of magnitude of the maximum total energy produced by neutrino emission of positron-electron pairs $\nu \rightarrow \nu e\bar{e}$, based on previous research on the production rate of this interaction in supernovae of varying magnetic field strengths. We demonstrate that the amount of energy retained in the supernovae by this interaction alone is not sufficient to account for the energy needed to reheat the shockwave in spherically symmetrical models.

[1]This work is generously supported by NASA/Arkansas Space Grant Consortium and the Hendrix Odyssey Program.

Todd Tinsley
Hendrix Collee

Date submitted: 09 Jan 2014 Electronic form version 1.4