Abstract Submitted
for the DNP06 Meeting of
The American Physical Society

What is the crust composition of accreting neutron stars?[1] JACOB FISKER, MARY BEARD, Joint Institute for Nuclear Astrophysics, University of Notre Dame, EDWARD BROWN[2], Joint Institute for Nuclear Astrophysics, Michigan State University — The nuclear reaction flow of an X-ray burst (XRB) on an accreting neutron star (NS) determines the composition of the burst ashes. These ashes subsequently descend down into the crust and influence many crustal properties of the NS such as the electric conductivity, the amount of heat, Q_c, deposited in the crust, and the competing neutrino loss rate. These factors determine the equilibrium core temperature relevant for probing the equation of state of the interior neutron star. Reciprocally, the crustal properties determine the heat flux through the atmosphere and thus influence the reaction flow of the XRBs. The crustal heat flux, $\dot{Q}_c$ has previously been calculated by assuming a composition of ashes given by pure ^{56}Fe and the ashes of the one-zone model of respectively. However, as the thermonuclear burning of the XRB may depend on $\dot{Q}_c$, we expand on these studies by using a self-consistent spherically symmetric XRB model to calculate the composition of the resulting XRB ashes for different values of the crustal heating rates. We report the results of this study for different accretion rates.

[1]This work is supported by the Joint Institute for Nuclear Astrophysics, NSF-PFC grant PHY02-16783.
[2]National Superconducting Cyclotron Laboratory

Edward Brown
Michigan State University

Date submitted: 15 Jun 2006 Electronic form version 1.4