1082-83-30 **Matthew Anderson*** (andersmw@indiana.edu), Wrubel Computing Center, 2711 East Tenth Street, Bloomington, IN 47408. *Neutron Star Evolutions using Tabulated Equations of State with a New Execution Model.*

Future achievements in computational science demand innovations in parallel computing models and methods to improve efficiency and dramatically increase scalability. One controversial issue is the relative value of global address space models and management versus more conventional distributed memory structure. This talk demonstrates one important use of global address space in the context of the advanced ParalleX execution model that has enabled improvements in neutron star simulations with a finite temperature equation of state.

The addition of nuclear and neutrino physics to general relativistic fluid codes allows for a more realistic description of hot nuclear matter in neutron star and black hole systems. This additional microphysics requires that each processor have access to large tables of data; the memory required for these tables can become excessive unless an alternative execution model is used. We present relativistic fluid evolutions of a neutron star obtained using a message driven multi-threaded execution model known as ParalleX and compare performance results with the conventional approach. We also discuss asynchrony management in the context of particle-in-cell, Barnes-Hut, and adaptive mesh refinement algorithms. (Received May 15, 2012)