Abstract Submitted
for the DNP10 Meeting of
The American Physical Society

Development of TReRaC Program for Stellar Explosion Research[1] KYLE THOMSEN, Tennessee Technological University, MICHAEL SMITH, ORNL — Hundreds of different thermonuclear reactions drive a star through its life cycle. If a star's death results in an explosion, elements created by these fusion reactions can be spread throughout the cosmos and ultimately form new stars, planets, and sometimes life. In an effort to further understand what happens when these reactions take place, researchers carry out both lab measurements and simulations to test the most current ideas about the origins of the elements. To better estimate the rates of these reactions, the Thermonuclear Reaction Rate Calculator (TReRaC) program has been written. The strength of this program lies in its acceptance of a wide variety of nuclear physics information as input and its incorporation into the Computational Infrastructure for Nuclear Astrophysics (CINA) – a suite of tools available to researchers around the world for nuclear astrophysics research. Among the information that TReRaC is capable of handling are each resonance's energy, spin / parity, entrance and exit channel widths, as well as non-resonant capture parameters. Currently, the code is capable of matching test rates to within the accuracy of the input, and we are finalizing the treatment of broad resonances.

[1]Research sponsored by the Office of Nuclear Physics, U.S. Department of Energy.

Kyle Thomsen
Tennessee Technological University

Date submitted: 02 Aug 2010 Electronic form version 1.4