Abstract Submitted
for the DNP11 Meeting of
The American Physical Society

STARLIB: A Next-Generation Reaction-Rate Library for Nuclear Astrophysics A.L. SALLASKA, C. ILIADIS, A.E. CHAMPAGNE, UNC/TUNL, F.X. TIMMES, S. STARRFIELD, ASU — One of the major inadequacies of current reaction-rate libraries is the absence of information on uncertainties. Although estimates have been attempted, these uncertainties are generally not based on rigorous statistical definitions. Clearly, a common standard for deriving uncertainties is warranted. STARLIB is a new, next-generation reaction-rate library that addresses this deficiency by providing a tabular, up-to-date database that supplies not only the recommended rate but also its factor uncertainty. The foundation of this library rests on an entirely new method for calculating reaction rates: Monte-Carlo simulation, which utilizes experimental nuclear physics quantities as inputs, yields a probability-density function for the reaction rate at a given temperature [1]. From the cumulative distribution of rate probability densities, the low, median, and high rates are naturally defined. In addition, quantities with upper limits are seamlessly included. This library attempts to bridge the gap between experimental nuclear physics data and stellar modelers by providing a convenient tabular format with reliable uncertainties for use in the simulation of astrophysical phenomena. We expect to submit STARLIB for publication by year's end, which will coincide with the unveiling of a webpage for ease of dissemination and updating.
[1] C. Iliadis *et al.*, Nucl. Phys., **A841**, 31 (2010).

A.L. Sallaska
UNC/TUNL

Date submitted: 05 Jul 2011 Electronic form version 1.4