

Abstract Submitted
for the APR21 Meeting of
The American Physical Society

Sensitivity study to identify impactful reactions in X-ray burst nucleosynthesis using MESA.¹ AMBER LAUER-COLES, Triangle Universities Nuclear Laboratory, IAN LAPINSKI, Shippensburg University, BRITTNEY CONTRERAS, University of Tennessee Knoxville, ARTHUR CHAMPAGNE, Triangle Universities Nuclear Laboratory — This work will discuss a sensitivity study based on a model of a low mass X-ray binary using Modules for Experiments with Stellar Astrophysics. Type I x-ray bursts are a thermonuclear explosion that occur in hydrogen and helium rich material on the surface of an accreting neutron star. Thermonuclear runaway proceeds up to the $A=100$ region via the (a,p) and (r,p) processes. Understanding these reactions is key to understanding the explosion mechanism, but many involve unstable nuclei that are difficult to produce for use in experiments. Thus, sensitivity studies are a useful steering mechanism to guide the experimental community and optimize the application of resources. The stellar model includes a nuclear reaction network of 305 species and all the reactions that connect them. This model is run many times in which a single reaction is varied by a factor to test its effect on important features of the model, such as observables and abundances. From this the most impactful reactions are selected. This talk will discuss the results of the first round, or coarse-resolution study and preliminary results of the second round, where finer-resolution variations of key reaction rates are being implemented.

¹This work is supported in part by the U.S. DOE under grant no. DE-FG02-97ER41033

Amber Lauer-Coles
Triangle Universities Nuclear Laboratory

Date submitted: 07 Jan 2021

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