Abstract Submitted
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**Identifying important X-ray burst reactions using stellar modelling in MESA**[1] AMBER LAUER, Triangle Universities Nuclear Laboratory, BRITTNEY CONTRERAS, University of Tennessee, Knoxville, IAN LAPINSKI, Shippensburg University, ARTHUR CHAMPAGNE, Triangle Universities Nuclear Laboratory — Type I x-ray bursts occur on accreting neutron stars via the (r,p) process during thermonuclear runaway up to the A=100 region. Studying these bursts will help in understanding the underlying star and its unknown physics. Unfortunately many of the reactions 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. We have begun such a study, based on a model of an accreting neutron star using Modules for Experiments with Stellar Astrophysics, which incorporates a nuclear reaction network of 305 species and 3000 reactions, including (n,g), (n,p), (n,a), (p,g), (a,p), (a,g), and weak reactions. A series of models is calculated in which a single reaction rate is varied to test its effect on features of the model, such as observables and abundances. From this we can identify the most useful and important reactions to the X-ray burst environment and the (r-p) process. This talk will discuss the process and preliminary results including the coarse-resolution study and its implications for the second round, currently under analysis, where actual uncertainties of key reaction rates are implemented, as well as future implications.

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