Abstract Submitted
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Testing the Importance of Nuclear Reactions in X-ray Bursts Using MESA[1] AMBER LAUER, Triangle Universities Nuclear Laboratory, BRITTNEY CONTRERAS, University of Tennessee Knoxville, ART CHAMPAGNE, Triangle Universities Nuclear Laboratory, LOW ENERGY NUCLEAR ASTROPHYSICS COLLABORATION[2] — Type I x-ray bursts are thought to occur on accreting neutron stars via the (r-p) process, a sequence of rapid proton captures and $\beta+$ decays that proceed up to the A = 100 region. 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. 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-γ), (n,p), (n-α), (p-γ), (α-p), (α-γ), weak reactions, and a few important complex reactions. A series of models is calculated in which each 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 in order to 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

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