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Sensitivity of Reaction Rates in X-Ray Burst Models JESSICA BOROWIAK, Central Michigan University, JINA, JACOB ELLIOTT, Central Michigan University, ALFREDO ESTRADE, Central Michigan University, JINA, ADAM JACOBS, JINA, Michigan State University , HENDRIK SCHATZ, JINA, Michigan State University, NSCL, KONRAD SCHMIDT, JINA, NSCL — We present a computational project on the rapid-proton capture process that occurs in accreting neutron stars. Our research involves conducting a sensitivity study of the rp-process to nuclear reaction rates in simulations using various compositions for the accreted material onto the neutron stars. In this research, we analyze the effects these variations of composition have on the resulting X-ray bursts simulated by a single-zone rp-process model. Current work is focused on modifying the initial abundances of accreted hydrogen and helium, including a range of values that correspond to the expected composition of X-ray burst sources with reliable observational data. Our objective is to determine which reaction rates have the largest effect on the modeled bursts. A second goal of the project is to implement a script to run the rp-process code in a distributed mode in a computer cluster. With this, we will be able to extend the sensitivity study to a finer grid of different chemical compositions of the accreted material. By running the sensitivity study and examining how the computational data compares with observational data, we can identify nuclear reactions that would need better experimental constraints to improve the accuracy of the rp-process model.

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