

Abstract Submitted
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Waiting Points and Bottlenecks in Nova and X-ray Burst Nucleosynthesis LEAH GOLDBERG, Oak Ridge National Laboratory — At Oak Ridge National Laboratory, we are investigating nucleosynthesis in nova explosions and X-ray bursts, specifically at “waiting points” and “bottlenecks” – unusual phenomenon in which nuclei interrupt the sequence of thermonuclear reactions that form heavier elements from lighter ones, significantly affecting the final abundances and the energy generation rate in stellar explosions. Nuclei identified as waiting points or bottlenecks seem to play a more important role in explosions and need to be singled out for further investigation. Such points are defined by a series of acceptance and rejection tests in a simulation, Computational Infrastructure for Nuclear Astrophysics (CINA), in which a suite of codes visualizes nucleosynthesis over a specified time interval and allows us, for each nucleus, to consider eight surrounding nuclei in the $Z=N$ plane based on possible reaction paths in the rp-process. After considering abundance, lifetime and reaction flux, reaction rate, and reaction Q-value, we accept or reject accordingly, and can then better ascertain the relationship between waiting points and bottlenecks and nuclear flow.

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