Abstract Submitted
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Urca Nuclide Production in Type-I X-ray Bursts and Implications for Nuclear Physics Studies[1] GRANT MERZ, ZACH MEISEL, Ohio University — The thermal structure of accreting neutron stars is affected by the presence of urca nuclei in the neutron star crust. Nuclear isobars harboring urca nuclides can be produced in the ashes of Type I X-ray bursts, but the details of their production have not yet been explored. Using the code `MESA`, we investigate urca nuclide production in a one-dimensional model of Type I X-ray bursts using astrophysical conditions thought to resemble the source GS 1826-24. We find that urca nuclei are generally produced late in the X-ray burst, during hydrogen-burning freeze-out that corresponds to the tail of the burst light curve. The relevant temperature for urca nucleosynthesis is therefore somewhat lower than the canonical conditions often assumed for nuclear physics experiments, altering the excitation energy range of interest in compound nuclei.

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