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Experimentally constraining the ^{30}P(p,γ)^{31}S reaction rate and its effect on nova nucleosynthesis[1] TAMAS BUDNER, MOSHE FRIEDMAN, CHRIS WREDE, ALEX BROWN, National Superconducting Cyclotron Laboratory, JORDI JOS, Universitat Politcnica de Catalunya, DAVID PREZ-LOUREIRO, YASSID AYYAD, National Superconducting Cyclotron Laboratory, DAN BARDAYAN, University of Notre Dame, KYUNGYUK CHAE, Sungkyunkwan University, ALAN CHEN, McMaster University, KELLY CHIPPS, Oak Ridge National Laboratory, MARCO CORTESI, BRENT GLASSMAN, National Superconducting Cyclotron Laboratory, MATTHEW HALL, University of Notre Dame, MOLLY JANASIK, National Superconducting Cyclotron Laboratory, JOHNSON LIANG, McMaster University, PATRICK O'MALLEY, University of Notre Dame, EMMANUEL POLLACCO, Universit Paris-Saclay, ATHANASIOS PSALTIS, McMaster University, JORDAN STOMPS, LIJIE SUN, JASON SURBROOK, TYLER WHEELER, National Superconducting Cyclotron Laboratory — Constraining the ^{30}P(p,γ)^{31}S reaction is crucial for understanding ONe nova nucleosynthesis. Its rate influences the isotopic and chemical abundances of nova ejecta, particularly in the Si-Ca mass region, which may help identify presolar grains of putative nova origin. The reaction proceeds primarily through proton capture into narrow, isolated resonances at low energies. By determining the strengths of a few key resonances, we can substantially reduce reaction rate uncertainties. We report the results of a ^{31}Cl β-decay experiment in which we measured the very weak proton emission branch of a low-energy resonance using the GADGET. We calculated the total thermonuclear rate and determined this to be the dominant resonance in the reaction. We use hydrodynamic simulations to study this rate's effect on nuclear yields in classical nova ejecta.

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