Abstract Submitted
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Constraining ^{30}P(p,γ)^{31}S for nova nucleosynthesis by measuring low-energy ^{31}Cl β-delayed proton decays[1] TAMAS BUDNER, MOSHE FRIEDMAN, CHRIS WREDE, 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 — Reducing uncertainties in the ^{30}P(p,γ)^{31}S reaction rate is important for understanding nucleosynthesis in ONe novae. This thermonuclear rate influences the isotopic ratios and chemical abundances of nova ejecta, constrains peak explosive temperatures, and provides insights into mixing between the underlying white dwarf and hydrogen-rich material from the donor star. The reaction proceeds primarily through proton capture into narrow resonance states lying just above the proton-emission threshold in ^{31}S. We determined the intensity of a very weak proton branch for a single, potentially dominant resonance by measuring ^{31}Cl β-delayed proton decays using the GADGET system. We report one of the smallest proton branching ratios ever measured for such low-energy resonances. Combined with a theoretical lifetime, we a report a lower limit on the total reaction rate.

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