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31Cl beta decay and the 30P31S reaction rate in nova nucleosynthesis[1] MICHAEL BENNETT, Michigan State U. Dept. of Physics and Astronomy, National Superconducting Cyclotron Laboratory, Joint Institute for Nuclear Astrophysics, C. WREDE, Michigan State U. Dept of Physics and Astronomy, National Superconducting Cyclotron Laboratory, B. A. BROWN, National Superconducting Cyclotron Laboratory, S. N. LIDDICK, National Superconducting Cyclotron Laboratory, Michigan State U. Dept of Chemistry, D. PREZ-LOUREIRO, Michigan State U. Dept of Physics and Astronomy, National Superconducting Cyclotron Laboratory, NSCL E12028 COLLABORATION — The 30P31S reaction rate is critical for modeling the final isotopic abundances of ONe nova nucleosynthesis, identifying the origin of presolar nova grains, and calibrating proposed nova thermometers. Unfortunately, this rate is essentially experimentally unconstrained because the strengths of key 31S proton capture resonances are not known, due to uncertainties in their spins and parities. Using a 31Cl beam produced at the National Superconducting Cyclotron Laboratory, we have populated several 31S states for study via beta decay and devised a new decay scheme which includes updated beta feedings and gamma branchings as well as multiple states previously unobserved in 31Cl beta decay. Results of this study, including the unambiguous identification due to isospin mixing of a new $l = 0$, $J^\pi = 3/2^+$ 31S resonance directly in the middle of the Gamow Window, will be presented, and significance to the evaluation of the 30P31S reaction rate will be discussed.

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Michael Bennett
Michigan State U. Dept. of Physics, National Superconducting Cyclotron Laboratory

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