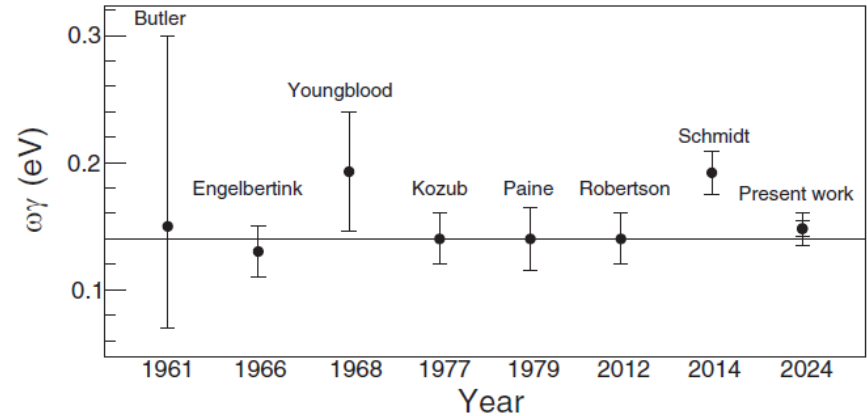
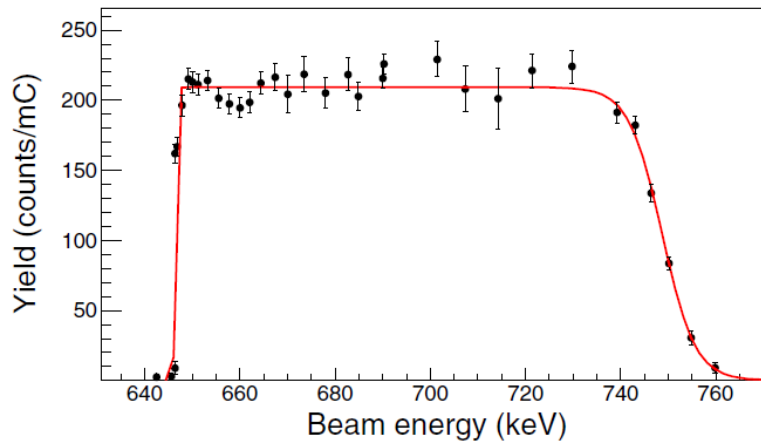


Strength measurements of the 647 and 1842 keV resonances in the $^{40}\text{Ca}(p,\gamma)^{41}\text{Sc}$ reaction



The strength of the $^{40}\text{Ca}(p,\gamma)^{41}\text{Sc}$ reaction is the key to understanding the endpoint of the nucleosynthesis pattern of ONe novae. Here we report direct measurements of the two strongest resonance strengths at 647 and 1842 keV. At novae temperatures, $0.2 < T_9 < 0.7$, the reaction is dominated by the low energy resonance whereas the higher energy resonance serves as a normalization standard for nuclear reaction experiments within the



astrophysically relevant energy range.

For the 647 keV resonance, we obtain a resonance strength $\omega\gamma = (2.51 \pm 0.09_{\text{stat}} \pm 0.22_{\text{syst}})$ meV, with an uncertainty a factor of 2.5 smaller than previously reported. For the 1842 keV resonance, we find a resonance strength $\omega\gamma = (0.148 \pm 0.006_{\text{stat}} \pm 0.013_{\text{syst}})$ eV, which is consistent with most previous studies but deviates by 2σ from the recent measurement of Schmidt *et al.* PRC 89, 045802 (2014).



Sidhu *et al.* PRC **111**, 025804 (2025), NSF Grant No. PHY-2310059 and OISE-1927130 (IReNA)

