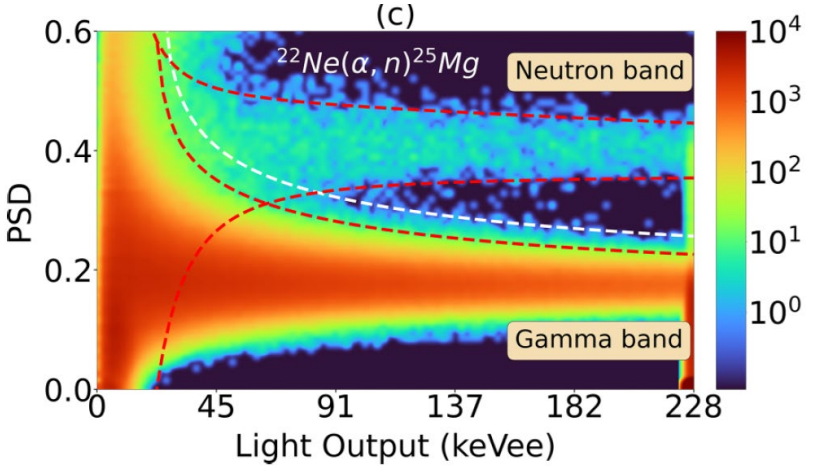
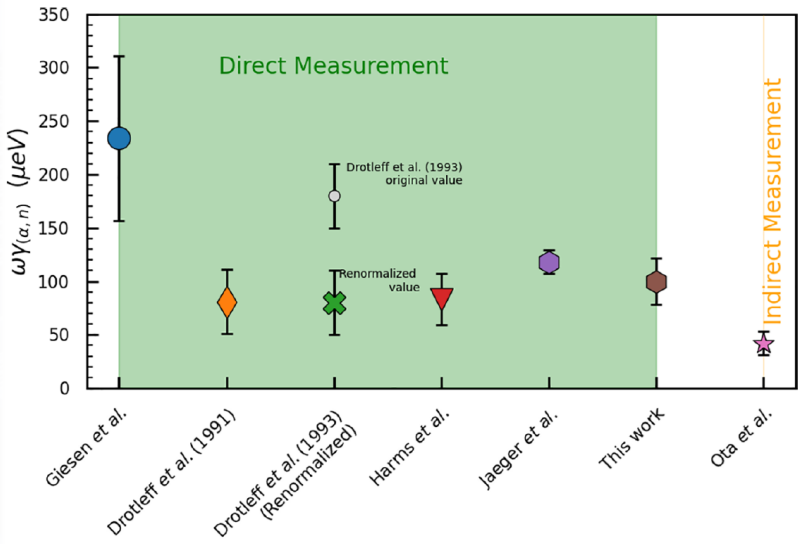
Strength measurement of the 830 keV resonance in the $^{22}Ne(\alpha,n)^{25}Mg$ reaction using a stilbene detector

The interplay between the $^{22}Ne(\alpha,\gamma)^{26}Mg$ reaction and the competing $^{22}Ne(\alpha,n)^{25}Mg$ reaction determines the efficiency of the latter as a neutron source at the temperatures of stellar helium burning. In both cases, the rates are dominated by the α-cluster resonance at 830 keV. This resonance plays a particularly important role in determining the strength of the neutron flux for both





the weak and main *s* process as well as the *n* process. Recent experimental studies based on transfer reactions suggest that the neutron and γ -ray strengths for this resonance are approximately equal. In this study, the $^{22}Ne(\alpha,n)^{25}Mg$ resonance strength has been remeasured and found to be similar to the previous direct studies. This reinforces an 830 keV resonance strength that is approximately a factor of 3 larger for the $^{22}Ne(\alpha,n)^{25}Mg$ reaction than for the $^{22}Ne(\alpha,\gamma)^{26}Mg$ reaction.

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