

$^{19}\text{F}(p,\gamma)$: Putting a Lid on the CNO Cycle

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The cold CNO cycle in massive stars ($M > 3M_{\text{sun}}$) has long been considered a closed cycle. The $^{19}\text{F}(p,\gamma)^{20}\text{Ne}$ reaction represents the only possible path for breakout and depletion of catalytic material. In addition, the corresponding production of Ne would be important for later stellar burning cycles. The strong background from $^{19}\text{F}(p,\alpha_2\gamma)^{16}\text{O}$ has prevented detailed measurements of the $^{19}\text{F}(p,\gamma)^{20}\text{Ne}$ reaction from being made in the past. A new series of measurements investigating low energy resonances and interference terms have been made at Notre Dame. The results and predictions of the new resonance parameters, reaction rates, and their effects on the CNO cycle will be discussed.