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**$^{18}$O($p$,$\gamma$)$^{19}$F resonance strength measurement at low energies**[1]
MATTHEW BUCKNER, CHRISTIAN ILIADIS, JOHN CESARATTO, CHRIS HOWARD, THOMAS CLEGG, ARTHUR CHAMPAGNE, STEPHEN DAIGLE, TUNL, UNC — As a $0.4M_{\odot} \leq M \leq 8M_{\odot}$ approaches the end of its stellar evolution, it will enter the asymptotic giant branch (AGB) stage and ascend the giant branch one final time. During the AGB stage, a star experiences significant mass loss, and grain condensation occurs in the stellar atmosphere. A subset of presolar oxide grains recovered from comet and meteorite samples can be attributed to this stellar environment; these grains feature $^{18}$O depletion that cannot be explained by existing AGB stellar models. An extra mixing process referred to as "cool bottom processing" (CBP) was proposed by Wasserburg et al. (1995) for low-mass AGB stars. The $^{18}$O depletion observed in these presolar grains may result from the $^{18}$O+$p$ process during CBP. A low energy, unobserved, narrow resonance exists within the ($p$,$\gamma$) reaction that may affect thermonuclear reaction rates near the CBP temperature regime. Though the $E_R^{lab} = 95$ keV resonance strength ($\omega\gamma$) has been constrained previously, measurements at the Laboratory for Experimental Nuclear Astrophysics (LENA) have improved the resonance strength upper limit. The effect this improvement has on $^{18}$O($p$,$\gamma$)$^{19}$F thermonuclear reaction rates will be discussed.

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