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**Determination of the stellar reaction rates of $^{17}$O($\alpha$,n)$^{20}$Ne and $^{17}$O($\alpha,\gamma$)$^{21}$Ne** ANDREAS BEST, SASCHA FALAHAT, JOACHIM GOERRES, MICHAEL WIESCHER, University of Notre Dame — The reaction $^{16}$O(n, $\gamma$)$^{17}$O acts a neutron poison in the weak s-process by reducing the number of available neutrons in the stellar burning environment. The captured neutrons can be re-emitted into the stellar environment via the reaction $^{17}$O(n, n)$^{20}$Ne, weakening the poisoning effect of $^{16}$O. This channel competes with the reaction $^{17}$O($\alpha,\gamma$)$^{21}$Ne, so that in order to determine the strength of $^{16}$O as a neutron poison it is important to know the reaction of both channels. Only limited information is available on the $^{16}$O($\alpha,n$)$^{20}$Ne and especially on the $^{16}$O($\alpha,\gamma$)$^{21}$Ne reaction, which leads to large uncertainties in the determination of the abundance production of the weak s-process. The ($\alpha,n$) channel has been measured in the energy range from 900 keV to 2300 keV using a high efficiency $4\pi$ neutron detector. To improve the efficiency determination of the detector the ($\alpha,n_1$) channel has been measured separately via gamma-ray spectroscopy and the detector response to the resulting neutron energy distribution has been modeled in a Geant4 simulation. An initial measurement of the ($\alpha,\gamma$) channel has been successfully completed and a second experiment using the new 5 HPGe detector array GEORGINA is in planning. Results of the finished experiments and the planned experiment will be discussed.

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