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Lifetime of the 4.033 MeV state in ^{19}Ne[1] BARRY DAVIDS, GORDON BALL, RITUPARNA KANUNGO, TRIUMF, MYTHILI SUBRAMANIAN, University of British Columbia — In astrophysical environments the ^{15}O(α,γ)^{19}Ne reaction proceeds predominantly through resonances lying just above the ^{15}O + α threshold at 3.529 MeV in ^{19}Ne. The reaction rate in novae is determined by the resonance strength of the 4.033 MeV $3/2^+$ state. This state may also make the largest contribution to the reaction rate at the higher peak temperatures reached in x-ray bursts. By populating these states and observing the subsequent α- and γ-decays, one can deduce the branching ratio $B_\alpha \equiv \Gamma_\alpha/(\Gamma_\alpha + \Gamma_\gamma)$. If Γ_γ is also known, one can then calculate the resonance strength and thereby the contribution of each state to the astrophysical rate of the ^{15}O(α,γ)^{19}Ne reaction. Experimental data on the radiative widths of these states are sparse. An effort to measure the lifetime of the 4.033 MeV state by the Doppler shift attenuation method (DSAM) resulted in an upper limit. A complementary measurement of the Coulomb excitation to this state at intermediate beam energies resulted in an upper limit on the radiative width, corresponding to a lower limit on the lifetime. The 95% confidence level allowed region for the lifetime, and therefore the reaction rate, spans two orders of magnitude. We are planning to measure the lifetime of this state using the DSAM, populating it via the ^{3}He(^{20}Ne,α)^{19}Ne reaction at a ^{20}Ne beam energy of 34 MeV.

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