

Abstract Submitted
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Prospects for Improved Measurements of the S-Process Neutron Source Reactions¹ CARL R. BRUNE, Ohio University — The $^{13}\text{C}(\alpha, n)^{16}\text{O}$ reaction is thought to be the main s-process neutron source, taking place in AGB stars at temperatures around 10^8 K. The $^{22}\text{Ne}(\alpha, n)^{25}\text{Mg}$ reaction is also thought to be an important neutron source and takes place in more massive stars at somewhat higher temperatures of $(2 - 3) \times 10^8$ K. Both reaction rates are uncertain at astrophysical temperatures due to the difficulty of measuring the low cross sections. In the case of $^{13}\text{C}(\alpha, n)^{16}\text{O}$, measurements exist down to $E_{c.m.} = 300$ keV but the extrapolation to the needed range of 150-200 keV is complicated by subthreshold resonances. The $^{22}\text{Ne}(\alpha, n)^{25}\text{Mg}$ reaction rate is dominated by narrow resonances – the possibility of as-yet-unobserved resonances near threshold leads to significant uncertainty in this reaction rate. The prospects for improved data using high-intensity beams, inverse kinematics, and background reduction techniques will be discussed.

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Carl R. Brune
Ohio University

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