Global R-matrix analysis of the ^{11}B$(\alpha, n)^{14}$N reaction

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Nucleosynthesis in the first generation of massive stars offers a unique setting to explore the creation of the first heavier nuclei in an environment that lacks any heavier nuclei impurities from earlier stellar generations. In later generations of massive stars, hydrogen burning occurs predominantly through the CNO cycles, but without the carbon, nitrogen, and oxygen that allow this catalytic reaction sequence, these stars would have to rely on the inefficient *pp*-chains for their energy production. However, there may be other reaction chain sequences that utilize only light elements that act as alternative pathways around masses 5 and 8 that activate under these special conditions. One such reaction chain could be ^{10}B(p,α)^{7}Be($\beta\nu$)^{7}Li(α,γ)^{11}C($\beta\nu$)^{11}B(α,n)^{14}N, which would also provide a neutron source to this early stellar environment. In this work, improved measurements are reported for the ^{11}B(α,n)^{14}N reaction made at the University of Notre Dame Nuclear Science Laboratory. A multichannel R-matrix analysis is presented that includes not only ^{11}B+α data, but also additional data sets from ^{14}C+p and ^{14}N+n measurements, in order to facilitate a comparison of the underlying nuclear structure and to better understand the systematic uncertainties of the different measurements. Additional measurements are underway at the CASPAR underground facility.