^{26}Al(n,p_1) AND (n,α_0) CROSS SECTIONS FROM THERMAL ENERGY TO 70 keV AND THE NUCLEOSYNTHESIS OF ^{26}Al

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We have measured the ^{26}Al(n,α_0)^{23}Mg and ^{26}Al(n,p_1)^{26}Mg* cross sections from thermal energy to approximately 10 keV and 70 keV, respectively. These reactions are thought to be the major mechanisms for the destruction of ^{26}Al in many nucleosynthesis environments; hence, an accurate determination of their rates is important for understanding the observations of γ rays from "live" ^{26}Al in our galaxy and of "extinct" ^{26}Al in meteorites. The astrophysical rate for the ^{26}Al(n,α_0)^{23}Mg reaction determined from our measurements is in good agreement with the rate determined via inverse measurements. On the other hand, the rate we determined for the ^{26}Al(n,p_1)^{26}Mg* reaction is significantly larger than previously reported. In addition, we were able to determine this rate in the temperature range below 0.2 GK which was not covered by previous measurements. This lower temperature range may be important for understanding the production of ^{26}Al in Red Giant stars. Both of our rates are significantly different than the rates used in most nucleosynthesis calculations. We discuss the impact of our measurements on the nucleosynthesis of ^{26}Al.

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