

Experimental study on the ${}^7\text{Be}(n, p){}^7\text{Li}$ and the ${}^7\text{Be}(n, \alpha){}^4\text{He}$ reactions for cosmological lithium problem

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We have measured two important neutron-induced reactions ${}^7\text{Be}(n, p){}^7\text{Li}$ and ${}^7\text{Be}(n, \alpha){}^4\text{He}$, which may act to reduce the primordial abundance of ${}^7\text{Li}$, by applying the Trojan Horse method with a ${}^7\text{Be}$ radioactive isotope beam in inverse kinematics. The obtained excitation functions suggest that the (n, p_0) and the (n, α) channels are basically consistent with the recent experimental studies, and the (n, p_1) channel may have a significant extra contribution which has not been known. We also performed a multi-channel R -matrix analysis to these three channels, confirming the present and the previous data from the point of view of the resonance structure. The result over the thermal neutron energy to the order of mega electron volt enables us to discuss the possible revision of the reaction rate and its impact on the cosmological lithium problem.