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Plan for the direct measurement of the $^{34}\text{Ar}(\alpha, p)^{37}\text{K}$ reaction in Gamow window using AToM-X at CRIB

The $^{34}\text{Ar}(\alpha, p)^{37}\text{K}$ reaction is critical for shaping the light curve and understanding the nucleosynthesis mechanism in X-ray bursts. Notably, it is regarded as one of the primary reactions contributing to the formation of double peaked light curves. So far several experiments have been performed to determine the reaction rate of $^{34}\text{Ar}(\alpha, p)^{37}\text{K}$; however, a definitive conclusion has not yet been reached because of a lack of experimental data. We aim to measure the cross section of $^{34}\text{Ar}(\alpha, p)^{37}\text{K}$ and determine its reaction rate in the Gamow window ($E_{c.m.} = 1.6\text{--}4.1$ MeV) for the first time using a ^{34}Ar beam provided by the CNS Radioactive Ion-Beam separator (CRIB) in RIBF. In this proposed experiment, a new active-target TPC (time projection chamber), called AToM-X will be employed to measure the energy loss and tracks of charged particles. Details of the experiment will be presented in this poster.

Consent

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