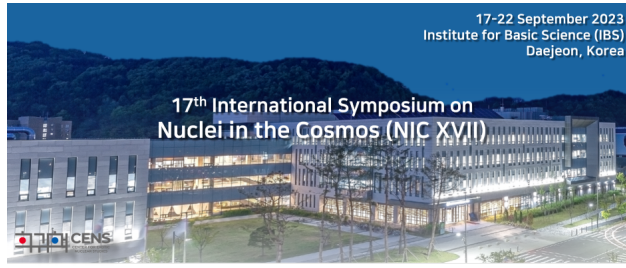


Nuclei in the Cosmos (NIC XVII)



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Direct measurement of the $^{26}\text{Si}(\alpha, p)^{29}\text{P}$ reaction at CRIB for the nucleosynthesis in the X-ray bursts

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In the X-ray bursts, the $^{26}\text{Si}(\alpha, p)^{29}\text{P}$ reaction rate is considered to have a great impact on the light curve. However, there were insufficient experimental data for this reaction because of technical difficulties. In order to measure the cross section of the reaction, a direct measurement was performed at the CNS RI beam separator (CRIB). CRIB produced a ^{26}Si beam with a typical intensity of 3.2×10^4 pps and a purity of 29%, which bombarded the ^4He gas target. The $^{26}\text{Si}(\alpha, p)^{29}\text{P}$ reaction was measured up to the center-of-mass energy of about 7.5 MeV using the thick gas target method. This energy region corresponds to about $T = 3$ GK of the Gamow energy. In spite of the large number of background events and the large statistical error, an upper limit on the reaction cross section was obtained, which was 0.134 times that of the NON-SMOKER statistical model.

This is the first experimental evaluation by direct measurement. Therefore, the result are useful to compare experimental and theoretical values at higher temperature and to constrain the $^{26}\text{Si}(\alpha, p)^{29}\text{P}$ reaction rate and the X-ray burst light curve model.

The analysis method and the results will be discussed.

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