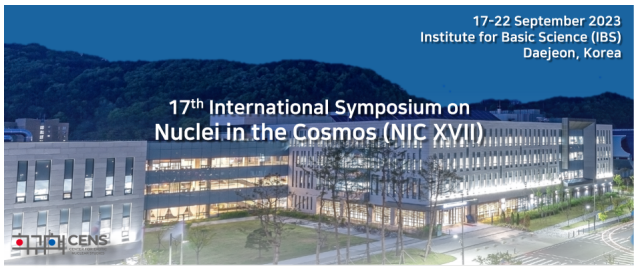

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Direct Measurement of the 14O(α,p)17F Cross Section

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14O(α,p)17F is one of the important reactions that strongly affects the light curves of Type I X-ray burst models [1]. The reaction rate is known to determine the break-out path from the hot CNO cycle to the rp-process at sufficiently high temperatures (T9 > 0.5) [2]. However, its large uncertainty due to the lack of experimental measurements causes difficulties in the precise demonstration of astrophysical observables.
In order to constrain the reaction rate, a direct measurement of the 14O(α,p)17F cross section was performed at CNS RI beam separator (CRIB), RIKEN. A 14N beam with the energy of 8.40 MeV/u and H2 gas cell target were used to produce the 14O beam. As a reaction target and charged particle detector, the Texas Active Target Time Projection Chamber (TexAT) was used [3]. The detector was developed at Texas A&M University, and upgraded to TexAT_v2 at the Center for Exotic Nuclear Studies (CENS), Institute for Basic Science (IBS) to optimize the detection efficiency for the (α,p) cross section measurement. The energy and position resolution of detected charged particles from the reaction are enhanced thanks to the three-dimensional tracking of the particles. Along with segmented silicon and CsI(Tl) detectors around the field cage, the TexAT enables measuring more precise cross sections as a function of center-of-mass energy. In order to manage about 2500 channels from various detectors, the GET electronics is used with the GANIL data acquisition system [4].
Details of the experimental setup and the results of preliminary analysis of the experiment will be discussed.

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