DREB2022 - Direct Reactions with Exotic Beams



Contribution ID: 202

Type: Oral contribution

Direct measurement of the 22Mg(alpha,p)25Al reaction using MUSIC relevant for Type I X-ray bursts

Tuesday 28 June 2022 16:00 (20 minutes)

The dominant (p, γ) nucleosynthesis flow in Type I X-ray bursts (XRBs) is halted at several waiting point nuclei such as ²²Mg, ^{24–26}Si, ^{28–30}S and ³⁴Ar due to (p, γ)-(γ , p) equilibrium. Reactions such as (α ,p) reactions assist the nucleosynthesis flow to bypass these waiting points. The present uncertainties in the relevant (α , p) reaction rates at these waiting points hinder the ability to accurately predict the light curve and ash composition of XRBs. For these waiting point nuclei, the ²²Mg(α ,p)²⁵Al reaction has been identified as an important reaction bypassing the waiting points for XRB nucleosynthesis. Thus, it is crucial to constrain the reaction rate of the ²²Mg(α ,p)²⁵Al reaction at astrophysical energies. To this end, we have performed a direct measurement of the ²²Mg(α ,p)²⁵Al reaction cross section in inverse kinematics using a ²²Mg beam from the Argonne In-Flight Radioactive Ion Separator (RAISOR) and the MUlti-Sampling Ionization Chamber (MUSIC) at Argonne National Laboratory. Preliminary results from this measurement will be discussed.

Topic

Experiment

Author: Dr JAYATISSA, Heshani (Argonne National Laboratory)

Co-authors: Dr KAY, Benjamin (Argonne National Laboratory); Dr HOFFMAN, Calem (Argonne National Laboratory); Prof. UGALDE, Claudio (University of Illinois at Chicago); Dr MUELLER-GATERMANN, Claus (Argonne National Laboratory); Dr SANTIAGO-GONZALEZ, Daniel (Argonne National Laboratory); Mr NETO, David (University of Illinois at Chicago); Dr POTTERVELD, David (Argonne National Laboratory); Dr WILSON, Gemma (Louisiana State University); Dr CHEN, Jie (Argonne National Laboratory); Dr LIANG, Johnson (Mc-Master University); Dr REHM, Karl Ernst (Argonne National Laboratory); Dr TEH, Kenneth (Argonne National Laboratory); Dr AVILA, Melina (Argonne National Laboratory); Dr CARPENTER, Michael (Argonne National Laboratory); Prof. AHN, Tan (University of Notre Dame); PSALTIS, Thanassis; Dr TANG, Tsz Lueng (Argonne National Laboratory); Dr ONG, WeiJia (Lawrence Livermore National Laboratory); MEISEL, Zach (Ohio University)

Presenter: Dr JAYATISSA, Heshani (Argonne National Laboratory)

Session Classification: TUE3