Contribution ID: **40**

Type: **Poster [Main Conference]**

Experiment to constrain models of calcium production in novae

Tuesday, 7 February 2017 16:45 (1h 15m)

Calcium is an element that can be produced in astrophysical explosions called classical novae. There are discrepancies between the abundance of Calcium observed astronomically in novae and what we expect to see based on astrophysical models. The present work describes preparations for a nuclear physics experiment designed to measure the energies of the excited states of 39Ca. Unbound states within 1 MeV of the proton threshold affect the production of Calcium in nova models because they act as resonances in the 38K(p,gamma)39Ca reaction. In the experiment, we will bombard a thin 40Ca target with a beam of deuterons. This bombardment will result in a tritons and 39Ca. We will be using a Q3D magnetic spectrograph in Munich, which will allow us to accurately measure the momenta of the tritons and therefore the excitation energies of the resulting 39Ca states. The present work describes simulations to determine the optimal spectrograph settings (observation angle, magnetic field) considering currently available nuclear-physics data, and investigated different target options. Using a target of pure calcium is problematic, since pure calcium reacts with air, so we decided to use a chemically stable compound CaF2. But doing so resulted in an extra contaminant, Fluorine, which can be dealt with by measuring the background using a LiF target. Ultimately, these simulations have led to settings and targets that will result in the observation of the 39Ca states of interest with minimal interference from contaminants.

Primary author: Mr TIWARI, Pranjal (MSU)

Co-authors: FRY, Cathleen (MSU/NSCL); WREDE, Chris (MSU/NSCL)

Presenter: Mr TIWARI, Pranjal (MSU)

Session Classification: Poster session