

of Physicists

Canadian Association Association canadienne des physiciens et physiciennes

Contribution ID: 1551

Type: Invited Speaker / Conférencier invité

Nova nucleosynthesis from phosphorus to the endpoint

Monday 29 May 2017 11:30 (30 minutes)

Classical nova explosions take place in binary star systems, in which a white dwarf is accreting matter from its companion star. Once enough material has been accreted, a thermonuclear runaway occurs on the white dwarf's surface, and the subsequent explosion ejects material into the interstellar medium. The thermonuclear $30P(p,\gamma)31S$ reaction rate influences the elemental and isotopic abundances of O-Ne nova nucleosynthesis, which affect the calibration of proposed nova thermometers and the identification of presolar grains of nova origin. The $38K(p,\gamma)39Ca$ reaction in turn influences the dynamics of the nucleosynthesis endpoint near A = 40, producing Ar and Ca in potentially observable amounts. Both reactions have lacked sufficient constraints from experiments. We will present experiments on these two reactions, using the β decay of 31Cl to populate levels of 31S of importance to the $30P(p,\gamma)31S$ reaction; and the first direct measurement of the $38K(p,\gamma)39Ca$ reaction using a beam of radioactive 38K.

Author: Prof. CHEN, Alan (Department of Physics and Astronomy, McMaster University) Presenter: Prof. CHEN, Alan (Department of Physics and Astronomy, McMaster University) Session Classification: M2-5 Nuclear Astrophysics (DNP) | Astrophysique nucléaire (DPN)

Track Classification: Nuclear Physics / Physique nucléaire (DNP-DPN)