Contribution ID: **50** Type: **Oral contribution**

Direct measurement of the 18F(p,a)15O reaction for application to nova gamma-ray emission.

Monday 26 June 2006 12:35 (20 minutes)

The 18F nucleus is one of the radioactive isotope produced during nova explosions. It is of particular interest since it is the main responsible for the 511 keV gamma-ray emission of novae that could be detected with the INTEGRAL satellite or future gamma-rays telescope. The amount of 18F synthesised still suffers from large uncertainties coming from missing nuclear information concerning the destruction reaction of 18F: 18F(p,alpha)15O.

In particular, the interference sign between three 3/2+ resonances in 19Ne, situated slightly above the proton threshold (8 keV and/or 38 keV) and at higher energy (665 keV), is unknown. The maximum effect of these interferences is lying in the energy range corresponding to the Gamow peak region, having a strong impact on the 18F(p,alpha)15O reaction rate.

We report here on the direct measurement at low energy (down to 400 keV in the center of mass) of the 18F(p,alpha)15O total cross section that we performed at the Louvain-la-Neuve CRC-RIB facility with the high intensity and purity 18F radioactive beam (T1/2 = 110 min). Total cross-section for the different incident energies will be presented and compared to previous experimental data, followed by a R-matrix analysis aiming at the determination of the interference sign of the relevant resonances.

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Session Classification: 2 Experiments in nuclear astrophysics I

Track Classification: Experiments in nuclear astrophysics