New low-energy direct measurement of the $^{18}\text{F}(p,\alpha)^{15}\text{O}$ reaction*

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The $^{18}\text{F}$, produced during nova explosions, is the main responsible for the 511 keV $\gamma$-ray emitted during the outburst that could be detected with satellite missions or future $\gamma$-ray telescopes [1]. In spite of many experimental efforts [2], the amount of $^{18}\text{F}$ synthesised still suffers from large uncertainties concerning, mainly, the $^{18}\text{F}(p,\alpha)^{15}\text{O}$ reaction.

We report here on a new direct measurement of the $^{18}\text{F}(p,\alpha)^{15}\text{O}$ cross section recently carried out at the RIB facility at Louvain-la-Neuve. Cross section data down to a centre-of-mass energy of 400 keV have been obtained using an isobarically pure $^{18}\text{F}$ beam (averaged intensity of the order of $10^6$ pps) and a thin polyethylene target. The reaction products were detected using the multi-strip detector array LEDA [3].

The cross section data are analysed in the framework of the R-matrix model [4]. Our main aim is to determine the interference sign between three $3/2^+$ resonances above threshold that can significantly affect the extrapolation of the $^{18}\text{F}(p,\alpha)^{15}\text{O}$ cross section to the energies relevant for novae, and thus, the modeling of the nova explosions.

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