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## Direct measurement of the $^{19}\text{F}(p, \alpha)^{16}\text{O}$ reaction

The  $^{19}\text{F}(p, \alpha)^{16}\text{O}$  reaction is important for understanding the fluorine abundance in the outer layers of AGB stars and it might also play a role in hydrogen-deficient post-AGB star nucleosynthesis. Up to now, theoretical models overproduce F abundances in AGB stars with respect to the observed values. Besides, for the  $(p, \alpha_0)$  channel there are discrepancies between the experimental data from the literature. In order to solve these discrepancies we present here a direct experiment performed at INFN-LNS using a silicon strip detector array (LHASA).

The  $^{19}\text{F}(p, \alpha)^{16}\text{O}$  reaction rate is the sum over the  $(p, \alpha_0)$ ,  $(p, \alpha_\pi)$  and the  $(p, \alpha_\gamma)$  channels. While the  $(p, \alpha_0)$  rate is well constrained by the present existing data, down to the lowest energies, almost nothing is known from experiments on the  $(p, \alpha_\pi)$  and  $(p, \alpha_\gamma)$  rates. Despite its importance, the  $S$ -factors and the branching ratio between the  $\alpha_0$ ,  $\alpha_\pi$  and  $\alpha_\gamma$  outgoing channels in the  $^{19}\text{F}(p, \alpha)^{16}\text{O}$  reaction are still largely uncertain at astrophysical energies. Thus, a direct measurement using the new detector, ELISSA, coupled with LHASA was performed at IFIN-HH. This setup is allowing us to discriminate the  $(p, \alpha_\pi)$  and  $(p, \alpha_\gamma)$  reaction rates at very low energies and extract the  $(p, \alpha_\pi)$  and  $(p, \alpha_\gamma)$  reaction cross section.

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