

## Preliminary results of $^{19}\text{F}(\text{p},\alpha)^{16}\text{O}$ reaction at astrophysical energies via the Trojan Horse Method

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The  $^{19}\text{F}(\text{p},\alpha)^{16}\text{O}$  reaction plays a key role in the study of fluorine destruction channel in the proton-rich outer layers of asymptotic giant branch (AGB). The discrepancy between models and observations in the abundances of  $^{19}\text{F}$  requires a revision of the nuclear reaction rates involved in the production and destruction of  $^{19}\text{F}$  in AGB stars [1]. The main destruction channel of fluorine in proton-rich environment is the  $^{19}\text{F}(\text{p},\alpha)^{16}\text{O}$  reaction, which happens in the outer layer of an AGB star, at  $T_9 \approx 0.2$  [2] which correspond to  $E_{cm} \leq 300$  keV [3]. An experiment was performed by means of Trojan Horse Method (THM) in Catania at Tandem LNS. The investigation of the relevant  $^{19}\text{F}(\text{p},\alpha)^{16}\text{O}$  two-body reaction is performed by selecting the QF-contribution of the  $^{19}\text{F}(^2\text{H},\alpha)^{16}\text{O}n$  three-body reaction, using the deuteron target as TH nucleus [4]. In this way it may be possible to extract the  $^{19}\text{F}(\text{p},\alpha)^{16}\text{O}$  cross section. The experimental conditions and the experimental set-up as well as some preliminary results will be presented.

[1] M. Lugaro et al., ApJ **615**, 934 (2004).

[2] M. La Cognata et al., ApJ **739**, L54 (2011).

[3] I. Indelicato et al., ApJ **845**, 19 (2017).

[4] arXiv:nucl-th/0208069