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## Spectroscopy of natural parity states in $^{20}\text{Ne}$ via the $^{19}\text{F}(p,\alpha^0)$ and $^{19}\text{F}(p,\alpha\text{pi})$ reactions at low energies

The  $^{19}\text{F}(p,\alpha)^{16}\text{O}$  reaction has a twofold importance: it allows to investigate the spectroscopy of low angular momentum high-energy states in the self-conjugate  $^{20}\text{Ne}$  compound nucleus and, at low energy, it is involved in astrophysical models aiming at describing the fluorine nucleosynthesis in stars.

Despite its importance, fragmentary (and often contrasting) experimental data on its absolute reaction cross section were reported in the literature. Recent direct experiments [1,2] triggered by prediction based on indirect techniques [3] led to a better understanding of the low energy behavior of the S-factor for the  $\alpha^0$  channel, and pointed out the contribution due broad states in  $^{20}\text{Ne}$ . Furthermore, a comprehensive and careful revision of all the data available in the literature has been recently performed [4]; this constitutes an excellent starting point for a general re-analysis on the spectroscopy of high-energy natural-parity states in  $^{20}\text{Ne}$ .

In this talk we will discuss preliminary results of a detailed R-matrix analysis of  $^{19}\text{F}(p,\alpha^0)^{16}\text{O}$  and  $^{19}\text{F}(p,\alpha\text{pi})^{16}\text{O}$  cross section data, and the consequent implications on the reaction rate played by the states contributing to both these reaction channels.

### REFERENCES

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