



LNGS SEMINARS

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$^{14}\text{N}(p,\gamma)^{15}\text{O}$: a key reaction of nuclear astrophysics

Abstract

The most important source of energy which powers the stars is hydrogen burning. For our Sun and for other low mass main sequence stars the hydrogen burning is realized mainly by the fusion reactions of the pp chains. In higher mass stars, on the other hand, the CNO cycles are the dominant processes of energy generation. The first CNO cycle is also important in the case of the Sun as its rate is directly related to the solar composition problem.

The slowest and thus most important reaction of the first CNO cycle is $^{14}\text{N}(p,\gamma)^{15}\text{O}$. Its cross section was measured in many experiments, for example the ones carried out by the LUNA collaboration at Gran Sasso. Still, the reaction rate of $^{14}\text{N}(p,\gamma)^{15}\text{O}$ is not known with a precision required for astrophysical models. Further experimental work is therefore needed.

In this talk the status of the $^{14}\text{N}(p,\gamma)^{15}\text{O}$ reaction is reviewed in light of an ongoing experimental campaign at Atomki and a planned project at the upcoming LUNA-MV accelerator.

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