

Direct measurement of the $^{13}\text{C}(\alpha, \text{n})^{16}\text{O}$ reaction at LUNA

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$^{13}\text{C}(\alpha, \text{n})^{16}\text{O}$ reaction is the main neutron source of the s process, which is responsible for the synthesis of about half of the heavy ($A > 58$) nuclei in the universe. This process takes place in the interiors of low mass AGB stars, with temperatures between 90 and 100 MK, corresponding to Gamow energies in the range of 140 and 230 keV.

The direct measurement of the $^{13}\text{C}(\alpha, \text{n})^{16}\text{O}$ reaction cross section towards the relevant energy range for astrophysics is the aim of a current experimental campaign of the LUNA experiment.

The low background condition in the LNGS deep underground laboratory, combined with the LUNA accelerator [1, 2] offers a unique possibility to suppress the natural neutron background that has so far been the limiting factor of direct measurements on the surface [3, 4].

Another important source of systematic uncertainty comes from the target degradation during the beam irradiation.

In the poster I will present the current status of the project, focusing the work on the analysis for the monitoring of the target degradation and the status of data analysis.

References

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- [4] Heil ,M. et al., Physical Review C78, 025803 (2008).