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Results and Perspectives of the LUNA Experiment

Wednesday, 29 November 2023 14:25 (25 minutes)

Pioneering nuclear reaction studies of astrophysical interest have been carried out at the Laboratory for Underground Nuclear Astrophysics (LUNA) for about three decades (see [1] for a recent review). Shielded by 1.4 km of rock under the Gran Sasso mountain, LUNA benefits from a million-fold reduction in cosmic-ray induced background compared to surface laboratories. This has made it possible, often for the first time, to push measurements towards the lowest energy frontiers of thermonuclear fusion.

Direct experimental studies of hydrogen-burning reactions (pp-chain, CNO-, NeNa- and AlMg-cycles) in various astrophysical sites have led to significant improvements in our understanding of the lives and deaths of stars and the origin of the chemical elements in the Universe.

In this talk, I will review some recent highlights on Big-Bang and stellar nucleosynthesis processes, and present exciting opportunities for upcoming studies of helium- and carbon-burning reactions at the recently installed 3.5MV accelerator.

[1] M. Aliotta, A. Boeltzig, R. Depalo, G. Gyurky, *Ann. Rev. of Nucl. Part. Sci.* 72 (2022) 177-204

Attendance Type

Remote

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