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Physikalisches Kolloquium

Dec. 19, 2023 at 4:15 p.m.
HS KPH

Prof. Marialuisa Aliotta
University of Edinburgh

LUNA: A Small Experiment With A Great Impact

The Laboratory for Underground Nuclear Astrophysics (LUNA), located under 1.4km of rock under the Gran Sasso Mountain in central Italy, provides an ideal location for nuclear reaction studies of astrophysical interest. Thanks to its million-fold reduction in cosmic-induced background, LUNA affords unique opportunities to push reaction measurements to the lowest accessible energies.

For over 30 years, the LUNA collaboration has thus pioneered studies of nuclear burning processes (pp-chain, CNO-, NeNa- and AlMg-cycles) directly at the relevant astrophysical energies, often for the first time [1]. In some cases, these efforts have led to remarkable results, such as for example the increased age of the universe, and have translated into a better understanding of stellar nucleosynthesis and the chemical evolution of our galaxy.

In my talk, I will review some of the major highlights of LUNA's activity and present exciting new 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

[2] G. Imbriani et al. A&A 420, 625-629 (2004)

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