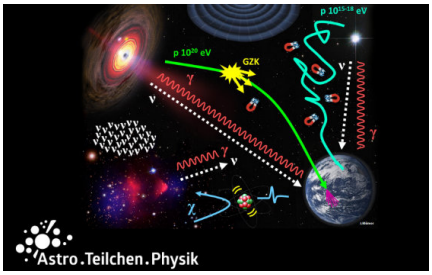

Contribution ID: **94** Type: **Poster**

Underground Nuclear Astrophysics

Wednesday, October 16, 2024 5:47 PM (2 minutes)

In the last three decades, underground accelerator laboratories have been essential for studying nuclear reactions at energies relevant to stellar environments, where cosmic-ray-induced background radiation would otherwise obscure the signals of interest.
Presently, there are only four such laboratories worldwide, two of them in Europe: The Felsenkeller shallow-underground laboratory in Dresden, Germany, with its 5\,MV accelerator \cite{Szucs19-EPJA} and the LUNA (Laboratory for Underground Nuclear Astrophysics) laboratory at Gran Sasso, Italy, with its 0.4\,MV and newly added 3.5\,MV accelerators \cite{Broggini18-PPNP}.

Felsenkeller, shielded by 45 meters of rock, hosts not only the accelerator but also Germany's lowest-background HPGe detector, called "TU1" \cite{Turkat23-APP}. The lab is uniquely positioned near the planned underground facility of the nascent Deutsches Zentrum für Astrophysik (DZA), which may provide a platform for interdisciplinary research in nuclear astrophysics and particle physics.

Both laboratories provide a combination of natural shielding along with advanced active and passive techniques to achieve high sensitivity for studying astrophysically significant processes, such as Big Bang nucleosynthesis, solar fusion \cite{Skowronski23-PRC}, and advanced capture reactions essential for heavy element formation. The poster will review recent progress at LUNA and Felsenkeller. Through the EU-supported ChETEC-INFRA EU project (2021-2025), both Felsenkeller and LUNA are freely accessible to all the scientific community, promoting international partnerships and advancing the field of nuclear astrophysics.

Summary

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Session Classification: Poster session leading into social dinner buffet