Contribution ID: **137** Type: **Oral**

The Piedicastello Tunnels: a Potential Underground Laboratory for Astroparticle Physics in Trento, Italy

Monday 25 August 2025 14:40 (20 minutes)

In the fields of astroparticle physics, nuclear astrophysics, and quantum computing, the identification of underground laboratories with suppressed cosmogenic backgrounds is of critical importance.
Located approximately 500 meters from the center of Trento, Italy, the Piedicastello tunnels lie beneath 100 meters of limestone rock from the Doss Trento hill. The site covers over 6,000 square meters and is currently used for events, temporary exhibitions, and educational activities.
A measurement campaign was conducted to characterize the gamma and muon backgrounds at various locations within the tunnels, employing NaI(Tl), CZT, and plastic scintillator detectors. In the deepest section, the muon flux was found to be approximately two orders of magnitude lower than at the surface, and a total gamma flux of about $2 cm^{-2} s^{-1}$ was measured.
In addition, several samples of rock, concrete, dust, and wall paintings, collected from the tunnel, were analyzed using a high-purity germanium spectrometer to identify major radioactive contaminants.
These results indicate that the Piedicastello tunnels could be a promising candidate for hosting facilities requiring low environmental background conditions.

Collaboration you are representing

Author: NOZZOLI, Francesco (Trento University & INFN-TIFPA)

Co-authors: Dr DIMICCOLI, Francesco (Trento University); Dr FOLLEGA, Francesco (Trento University); Prof. IUPPA, Roberto (Trento University); Dr VERROI, Enrico (INFN-TIFPA)

Presenter: NOZZOLI, Francesco (Trento University & INFN-TIFPA)

Session Classification: Underground Laboratories

Track Classification: Underground Laboratories