Contribution ID: **473** Type: **Parallel talk**

The underground ultra-low background laboratory STELLA (SubTErranean Low Level Assay) at the Laboratori Nazionali del Gran Sasso (Italy) –present and future

Monday 28 August 2023 16:30 (15 minutes)

The underground ultra-low background laboratory STELLA (SubTerranean Low Level Assay) in the Laboratori Nazionali del Gran Sasso of the National Institute of Nuclear Physics (LNGS-INFN) is principally dedicated to material screening measurements for fundamental physics experiments installed in the underground laboratories. It is mainly using gamma-ray spectrometry, but also alpha and beta spectrometry on small selected samples. The high level of performance of the ultra-low background detector systems allow for analysing extremely low concentrations of natural and man-made radioactivity in a wide range of materials down to a level of few μBq kg^{-1}.
Thanks to the extremely low background levels of the gamma-ray detection systems (ultra low background high purity germanium detectors) also basic physics results on rare radioactive decays are obtained that in some cases could also give rise in the future to new detector technologies for experiments searching for these rare radioactive decays.
The installations and experimental set-ups using ultra-low background techniques will be described shortly, and examples of significant measurements for both applications, material screening and basic physics, will be presented. Finally, the planned future upgrade of the STELLA laboratory and its possible impact will be discussed.

Submitted on behalf of a Collaboration?

No

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Session Classification: Underground laboratories

Track Classification: Underground laboratories