



Contribution ID: 21

Type: **not specified**

# Microdosimetry of low dose radiation fields in the framework of the DISCOVER22 project - (remote)

*Tuesday, 20 August 2024 17:00 (30 minutes)*

20-minute talk + 10-minute questions

While high doses of ionizing radiation are known to harm human health, the effects of low dose radiation (LDR) are debated. LDR has been shown to influence immune responses, possibly inducing beneficial effects, but the underlying mechanisms are not well understood. Research on LDR effects is often affected by uncertainties like unmonitored radiation quality and uncontrolled physical variables. The Gran Sasso Laboratories of the Italian National Institute of Nuclear Physics (INFN-LNGS) provide a unique environment for studying LDR's effects, with significantly reduced cosmic ray and neutron exposure. In these labs, the gamma dose rate is about 20-25 nGy/h, resulting in a weekly total of approximately 4  $\mu$ Gy. At such low doses, radiation interaction is highly stochastic, making absorbed dose alone an insufficient measure. To improve the correlation between biological responses and radiation exposure, we will use microdosimetric techniques to monitor the energy deposition and LET distribution continuously. A specialized tissue equivalent proportional counter (TEPC), simulating 1-2  $\mu$ m of biological tissue, will be employed to capture detailed microdosimetric spectra. This TEPC, designed by INFN, can detect around 30,000 events daily, providing robust data to characterize indoor and outdoor radiation environments. Initial findings from these measurements will be presented and analyzed.

**Presenter:** BIANCHI, Anna

**Session Classification:** Studies of Life in Low Background Radiation