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An ICP-MS based dust monitoring methodology to evaluate dust background mitigation procedures

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Rigorous radioactive background constraints are necessary for rare-event search experiments to meet their sensitivity goals. Underground facilities provide ideal attenuation of cosmic radiation, shielding materials around the detectors are used to mitigate backgrounds from soil, and extensive radioassay campaigns are performed to source the most radiopure materials. To reduce the impact of particulate deposition on material surfaces, detectors are assembled and operated in cleanroom facilities. Even so, dust particulate fallout on rare-event detector materials remains a concerning source of radioactive backgrounds. Within the low-background community, much effort is being invested to investigate, inform, and mitigate dust backgrounds. In this work, an ICP-MS based methodology for the direct determination of fallout rates of radionuclides and stable isotopes of interest from dust particulate was employed to monitor key experimental areas at the SNOLAB facility. Hosted in an active mine at a depth of 2070m, the SNOLAB underground laboratory strives to maintain experimental areas at class-2000 cleanroom level. This work provides insights on dust background mitigation procedures in place at SNOLAB, and informs backgrounds from dust particulate fallout during underground laboratory activities.

Submitted on behalf of a Collaboration?

No

Authors: FRENCH, Amanda (Pacific Northwest National Laboratory); HOPPE, Eric (PNNL, US); ARNQUIST, Isaac (Pacific Northwest National Laboratory); HALL, Jeter (SNOLAB/Laurentian University); DI VACRI, Maria Laura (Pacific Northwest National Laboratory); ROCCO, Nicole (Pacific Northwest National Laboratory); Dr SCORZA, Silvia (CNRS/LPSC Grenoble); SCHLIEDER, Tyler (Pacific Northwest National Laboratory)

Presenter: DI VACRI, Maria Laura (Pacific Northwest National Laboratory)

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