Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **2568** Type: **Oral (Non-Student) / Orale (non-étudiant(e))**

# Characterizing the SNOLAB radiation environment

*Monday 3 June 2019 14:00 (15 minutes)*

The flux of thermal neutrons, fast neutrons, and gamma photons, arising due to radioactivity in the materials surrounding the detector, constitute the principle component of the radiation environment for the underground experiments at SNOLAB. The flux of fast neutrons comprising ($\alpha$, n) and spontaneous fission constitutes a significant background and the SNO collaboration estimated this flux to be $\sim$ 4000 neutrons $\mathrm{m}^{-2}$ $\mathrm{day}^{-1}(2\pi\mathrm{sr})^{-1}$, with an unknown spectrum. PICO-2L, operating as a very sensitive low background fast neutron detector with shielding removed, measured this fast neutron flux for $\sim$ 20 live-days. We performed a simulation of neutron propagation for PICO-2L to understand the spectral shape of the fast neutron flux, the detector sensitivity and the effect of the drift environment on neutron propagation. Through comparing and correlating the simulations with PICO-2L and previous measurements for gamma fluxes, slow and fast neutrons, and understanding the radioactive contamination of the materials around the detector, a coherent model for the radiation environment in the SNOLAB drifts can be constructed.

**Authors:** TIWARI, Deepak (PICO Collaboration, Universite de Montreal); PICO COLLABORATION

**Presenter:** TIWARI, Deepak (PICO Collaboration, Universite de Montreal)

**Session Classification:** M2-3 Particles deep underground (PPD) | Particules profondément sous terre (PPD)

**Track Classification:** Particle Physics / Physique des particules (PPD)