Contribution ID: **134** Type: **Contributed Oral**

PICO-500 Detector Calibrations

Friday, 16 February 2024 21:00 (15 minutes)

PICO-500 is a WIMP dark matter bubble chamber detector in its early stages of construction underground at SNOLAB. It is the upscaled successor of PICO-40L, which is currently operational with the objective of detecting dark matter or improving the world leading spin-dependent WIMP search limits set by PICO-60 in 2016. PICO-500 will have almost an order of magnitude greater sensitivity with a ~250 litre active volume of superheated C_3F_8 (freon) inside a quartz vessel with bellows to enable expansion and compression of the fluid. Its detection method is based on the Seitz model, in which recoiling freon nuclei from incoming WIMP scatters results in localized boiling if the energy deposition, within a critical radius, is in excess of the threshold energy. As was done for PICO-40L and PICO-60, the operating threshold of PICO-500 will be optimized for sensitivity to dark matter, and insensitivity to electron recoils caused by gammas and electrons entering the detector. The electron recoil sensitivity will be probed by introducing an 18 MBq ^{60}Co gamma source into the detector and measuring the bubble nucleation rate. Cross-verification between data and simulations from PICO-40L calibrations, as well as enhancements to the calibration system for PICO-500, will contribute to an exceedingly precise understanding of the PICO-500 detector response.

Your Email

michaela.robert@queensu.ca

Supervisor

Tony Noble

Supervisor Email

noble.potato@gmail.com

Affiliation

Queen's University

Your current academic level,

MSc student

Primary author: ROBERT, Michaela (Queen's University)

Presenter: ROBERT, Michaela (Queen's University)

Session Classification: Evening 3 - Feb. 16, 2024

Track Classification: Dark Matter Searches