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Contribution ID: **3136** Type: **Oral Competition (Graduate Student) / Compétition orale (Étudiant(e) du 2e ou 3e cycle)**

(G*) Laser Absorption Spectroscopy for Methane Sensing in SPCs for the NEWS-G Experiment

Monday 6 June 2022 17:15 (15 minutes)

NEWS-G is a direct detection dark matter experiment specializing in low mass (sub ˜1 GeV) WIMP (Weakly Interacting Massive Particles) searches. NEWS-G uses spherical proportional counters (SPCs), a type of gas-ionization detector capable of observing the signal from single-electrons via a small (˜1 mm radius) high-voltage anode sensor. While SPCs primarily use noble gases as their target medium, methane (CH_4) is also a suitable gas due to its high concentration of hydrogen atoms –optimal for observing low mass WIMP interactions. 300 mbar of pure CH_4 was even used as the target medium during the 2019 measurement campaign at the Laboratoire Souterrain de Modane with "SNOGLOBE"–NEWS-G's 140 cm SPC. However, a disadvantage of NEWS-G's detectors is that there is currently no reliable way of monitoring the absolute concentrations of gases inside, crucial for accurately determining the target mass. At the University of Alberta, we have been working on improving our gas sensing capabilities by developing a laser absorption spectroscopy (LAS) system designed for measuring concentrations of CH_4 in circulation with a 30 cm SPC. In this talk, I will outline the development and testing of this new LAS system for live CH_4 monitoring and use alongside NEWS-G's radon trapping setup.

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