



Canadian Association
of Physicists

Association canadienne
des physiciens et physiciennes

Contribution ID: 3758 Type: **Oral Competition (Graduate Student) / Compétition orale (Étudiant(e) du 2e ou 3e cycle)**

(G*) Newest results from the NEWS-G dark matter experiment at the LSM

Tuesday 20 June 2023 16:00 (15 minutes)

In the Fall of 2019, the NEWS-G experiment used its latest detector, a 140 cm diameter Spherical Proportional Counter (SPC) to search for low-mass dark matter at the Laboratoire souterrain de Modane (LSM), in France. SPCs are metallic spheres filled with gas, with a high voltage anode at the centre that attracts and amplifies ionization charges coming from atomic recoils. Having the sphere filled with pure methane, hydrogen was used as the target to produce new limits on the proton spin-dependent cross-section around masses of 1 GeV.

This talk will first introduce the NEWS-G experiment and describe the commissioning at the LSM with the shielding used, the SPC detection principle and the new multi-anode sensor. It will then focus on the calibrations using a UV laser and argon-37, as well as the background discrimination methods to remove alpha-induced events and spurious pulses coming from the electronics. Finally, it will explain the profile likelihood ratio method that was used in order to derive constraints on WIMP mass and cross-section.

Keyword-1

dark matter

Keyword-2

NEWS-G

Keyword-3

Primary author: COQUILLAT, Jean-Marie

Presenter: COQUILLAT, Jean-Marie

Session Classification: (PPD) T4-3 Discovering New Paths to Discovery: New Technologies and Methods to Uncover BSM Physics Symposium | Symposium sur les nouvelles technologies et méthodes pour découvrir la physique au delà du modèle standard (PPD)

Track Classification: Symposia Day (Tues. June 20) / Journée de symposiums (mardi, le 20 juin): Symposia Day (PPD - PPD) - Discovering New Paths to Discovery: New Technologies and Methods to Uncover BSM Physics | Découvrir de nouvelles voies vers la découverte : Nouvelles technologies et méthodes pour découvrir la physique au-delà du modèle standard