Contribution ID: **141** Type: **Oral presentation**

Low mass dark matter searches with NEWS-G: Results with a methane target

Tuesday 19 July 2022 15:30 (20 minutes)

The NEWS-G collaboration is searching for light dark matter using spherical proportional counters. Access to the mass range from 50 MeV to 10 GeV is enabled by the combination of low energy threshold, light gaseous targets (H, He, Ne), and highly radio-pure detector construction. Initial NEWS-G results obtained with SEDINE, a 60 cm in diameter spherical proportional counter operating at the Laboratoire Souterrain de Modane (France), excluded for the first time WIMP-like dark matter candidates down to masses of 500 MeV/c2.

The NEWS-G collaboration has constructed a new, 140 cm in diameter, spherical proportional counter at LSM using 4N copper with 500 um electroplated inner layer. Prior to shipping the detector to SNOLAB, a short data-taking campaign was undertaken at LSM using methane, which provides sensitivity down to 100 MeV/c2 for spin-independent and spin-dependent dark matter nucleon interactions. To capitalise on this potential, robust calibrations of the detector response to single ionisation electrons are required, which is accomplished primarily with a UV laser and a 37Ar purpose-made gaseous source. New physics results from this run, leading to world-leading spin-dependent sensitivity will be presented. Moreover, new results in the search for Solar Kaluza-Klein axions with the SEDINE, the most recent NEWS-G measurements of neon and methane quenching factors will be presented.

Author: NIKOLOPOULOS, Konstantinos (University of Birmingham (GB))

Presenter: VAZQUEZ DE SOLA, Francisco Andres

Session Classification: Parallel 2A - Direct detection I