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NEWS-G searches for light dark matter: Results with a hydrogen-rich target

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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 0.5 GeV.

The construction of a new, 140 cm in diameter, spherical proportional counter constructed at LSM using 4N copper with 500 um electroplated inner layer will be presented, along with its installation and commissioning at SNOLAB (Canada), where it is scheduled to collect data with an improved shielding later this year.

Before the detector was shipped to Canada, a short data-taking campaign was undertaken at LSM using methane. New physics results from this run, leading to world-leading spin-dependent sensitivity will be presented.

Furthermore, the design and construction of ECUME, a 140 cm in diameter spherical proportional counter fully electroformed underground will be discussed. The potential to achieve sensitivity reaching the neutrino floor in light Dark Matter searches with a next generation detector is also summarised.

In-person participation

Yes

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