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Contribution ID: **285** Type: **Oral Competition (Graduate Student) / Compétition orale (Étudiant(e) du 2e ou 3e cycle)**

(G*) Simulation-based Studies of Fiducialization and Potential Directionality for the NEWS-G Experiment

Thursday 10 June 2021 16:45 (10 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) - gas-ionization detectors capable of observing signals from single-electrons through the use of a small (˜1 mm radius) high-voltage anode sensor at their centre. With the increasingly complex nature of the sensory equipment used with large-scale SPCs, which use an improved 11-anode ACHINOS sensor, study of detector properties through simulation is needed to corroborate results of data analyses. The ACHINOS sensor groups anodes using 2-3 electronic channels, discriminating event signals by detector volume. Electronic drift simulation of the sensor-wise distribution of event-by-event primary electrons allows for the characterization of the fiducial volume for each channel. Improvements to ACHINOS sensors, supported by simulation, could allow for SPC detector directionality via finer volume discrimination. This talk will demonstrate the implications of using an 11-anode ACHINOS sensor within a large (˜135 cm radius) SPC through simulation, focusing on detector fiducialization and the feasibility of SPC directionality with greater multi-channel ACHINOS sensors.

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