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The ACHINOS sensor in the NEWS-G experiment

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The NEWS-G experiment aims for the direct detection of low mass Weakly Interacting Massive Particle (WIMP) dark matter using Spherical Proportional Counters (SPC). At the center of the SPC, a small sensor held at high voltage drives the drift of the primary ionization and provide the amplification needed to detect sub-keV nuclear recoils down to single electrons. The ACHINOS is a novel multi-channel sensor at the center of the SPC that allows for high amplification and better primary ionization collection thanks to enhanced electric fields at larger radius. The current implementation of ACHINOS in the NEWS-G SPC has two channels that separate the active volume in a north and south hemisphere. Future implementation of ACHINOS with multi-channel readout could allow for the directional measurement of dark matter in a large, low-pressure SPC. In this talk, the operating principle of the ACHINOS sensor will be presented along with recent experimental data highlighting the features of a two-channel readout in the NEWS-G SPC.

Primary author: Mr SAVVIDIS, George (Queen's University)

Presenter: Mr SAVVIDIS, George (Queen's University)

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