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Characterization of the NEWS spherical gas detectors

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The NEWS (New Experiments with Spheres) project employs novel spherical gas detectors that are very sensitive to very low energy deposition. Each detector consists of a spherical gas volume with a small central electrode forming a radial electric field. At Queen's University we are currently working with a few prototype detectors for their characterization under different working conditions such as gas, pressure, high voltage and sensor. We proved that sub-keV energy threshold with good energy resolution can be achieved and demonstrated that the detectors can be used to measure particle energy loss functions along their tracks in the gas. The testing of data acquisition system, electronics, gas handling system and studies of noise reduction are proven useful for designing the larger scale low-mass dark matter detector to be located underground at SNOLAB, the NEWS-SNO experiment.

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