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Background discrimination for low quanta events with NEWS-G

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The New Experiment With Sphere-Gas (NEWS-G) employs spherical proportional counters (SPC) filled with gas to search for elastic scattering of WIMPs off light target nuclei, reaching sensitivities down to single ionisation electrons. The new-generation detector consists of a larger sphere of 140 cm diameter, equipped with a new multi-anode sensor, "ACHINOS", developed to ensure a sufficiently strong electric field at large radii while maintaining the capacity to achieve high gain. Due to the increased detector size, at low interaction energies the quantised nature of the ionisation process generates visible structure in the detector response. This can be exploited to identify and reject backgrounds with the goal to improve our sensitivity to WIMP recoils. In this talk, we will describe the background-rejection processing of low energy data from NEWS-G's S140, and the characterisation of its performance based on laser and Ar37 calibrations.

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