Contribution ID : **53** Type : **Nuclear and Particle Astrophysics**

Analysis and Identification of Alpha Events for NEWS-G

Thursday, 11 February 2021 16:00 (15)

The NEWS-G experiment uses a spherical proportional counter filled with gas in order to detect potential dark matter particles that can ionize the gas after a nuclear recoil. The detector works by attracting the free electrons towards the centre of the sphere where there is a high voltage anode inducing a radial electric field. Near the anode, the accelerated electrons then cause a Townsend avalanche that produces many drifting ions, which creates an identifiable electrical signal. Since this method has been most efficient at energies below 1 GeV, that is where keeping the background contamination at minimum is of utmost importance. However, there is approximately 20 mBq of alpha particles coming from impurities in the copper surface of the sphere that create a sudden influx of events close to the region of interest for up to five seconds. These alphas also lead to fluctuations in the electric field, which in turn alters the time taken for electrons to reach the anode at the centre. This presentation aims to show how the consequences of alpha particles in the detector can be characterized, as well as how those consequences can be used to better identify alpha events in order to remove the correlated influx of low energy events.
*On behalf of the NEWS-G collaboration

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Please select: Experiment or Theory

Experiment

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