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Ex-situ measurement of particulate cleaning for ultra-low background experiments

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Radioactivity in particulates contributes significantly to the background in ultra-low background experiments. The alpha generated from dust provides a degraded energy signal on the detector that mimics low-energy nuclear recoil events, which is background to rare event particle detectors, especially dark matter search experiments. A particulate cleaning station, which includes controlled gas flow on the material surface, a flowmeter, an optical microscope, and a profilometer to scan the surface, has been developed and used to study the cleaning efficiency of dust with various speeds of gas. In this talk, the hardware of the system, the analysis technique, and the cleaning efficiency of different materials and sizes of dust with various gas speeds will be presented.

Keyword-1

Dark matter

Keyword-2

Radioactivity

Keyword-3

Particle detector

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