

Abstract Submitted
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Alpha Background Rejection in Bolometer Detectors NICHOLAS DEPORZIO, Northeastern University — This study presents the modification of bolometer detectors used in particle searches to veto or otherwise reject alpha radiation background and the statistical advantages of doing so. Several techniques are presented in detail – plastic film scintillator vetoes, metallic film ionization vetoes, and scintillating bolometer vetoes. Plastic scintillator films are cooled to bolometer temperatures and bombarded with 1.4MeV to 6.0MeV alpha particles representative of documented detector background. Photomultipliers detect this scintillation light and produce a veto signal. Layered metallic films of a primary metal, dielectric, and secondary metal, such as gold-polyethylene-gold films, are cooled to milli-kelvin temperatures and biased to produce a current signal veto when incident 1.4MeV to 6.0MeV alpha particles ionize conduction paths through the film. Modified Zinc Molybdate Bolometers are used to produce scintillation light when stimulated by alpha background. Calibration of veto signal to background energy is presented. Results are used to quantify the statistical impact of such modifications on bolometer searches.

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