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Modeling surface alpha backgrounds from radon progeny plate-out

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The next generation low-background detectors operating deep underground aim for unprecedented low levels of radioactive backgrounds. The surface deposition and subsequent implantation of radon progeny in detector materials will be a source of energetic background events. We investigate Monte Carlo and model-based simulations to understand the surface implantation profile of radon progeny. Depending on the material and region of interest of a rare event search, these partial energy depositions can be problematic. Motivated by the use of Ge crystals for the detection of neutrinoless double-beta decay, we wish to understand the detector response of surface backgrounds from radon progeny. We look at the simulation of surface decays using a validated implantation distribution based on nuclear recoils and a realistic surface texture. Results of the simulations and measured alpha spectra is presented.

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