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Calculation and Mitigation of Neutron-Induced Backgrounds in Rare Event Search Experiments

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Neutron-induced backgrounds pose a significant challenge in experiments designed to detect rare events, such as dark matter interactions and neutrinoless double-beta decay. This talk discusses the characteristics of these backgrounds, focusing on neutron generation via spontaneous fission and α,n reactions. These processes are particularly critical in underground experiments, where the continuous emission of radiogenic neutrons from the detector materials is, to some extent, unavoidable. We present the latest advancements in neutron yield calculations using new tools and updated cross-sections and discuss strategies for mitigating these backgrounds, including material selection and shielding optimization.

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