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(a,n) reactions in low-background neutrino experiments

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Neutrons and gammas produced by alpha interactions with detector materials can hide the signal searched for in low-background neutrino experiments. Despite the high purity of the materials selected, alpha particles from the U and Th chain, and in particular from the decay of ^{222}Rn, such as ^{210}Po, can still have a high enough rate to produced a non-negligible amount of neutrons and gammas during the lifetime of the experiments. The combination of the prompt neutron signal with the delay capture can mimic the inverse-beta decay event, which is relevant for antineutrino analyses; or can fall in the region of interest for the neutrinoless double-decay searches. High energy gammas, produced by the de-excitation of the produced nuclei or emitted in the neutron capture reactions, can create a background for nucleon decay through invisible modes searches and for neutrino-electron scattering and neutrino-nucleus interactions. Furthermore, neutrons can be a potential source of background for supernova and solar neutrino studies. In this talk, the importance of a full understanding of the (α,n) and (α,nγ) reactions in the low-background neutrino field is presented.

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