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γ background reduction in $0\nu\beta\beta$ searches with organic compound holder

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I present dedicated studies and measurements aiming to the reduction of the γ background in the $0\nu\beta\beta$ ROI for TeO_2 calorimeters. This is mainly due to 2615 keV γ 's scattering Compton with materials next to the detectors. It can be lowered by replacing the usual copper holders with organic compounds structures. TeO_2 crystals, positioned in a PMMA holder, have been characterized. In particular, they have an energy resolution of ~ 5 keV at 2615 keV, the same of a copper holder, built as reference. The PMMA assembly ROI background is lower than the one in copper. A more realistic application has been considered by simulating the inner CUORE detector supporting structure made of PMMA. I obtain a considerable γ background reduction factor of $4.7^{+0.5}_{-0.6}$ for photons coming from environmental sources and of $5.0^{+0.1}_{-0.2}$ for near detector contaminations.

Collaboration name

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