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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 $\sim$ 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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