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A thermal model for low-temperature TeO_2 calorimeters read out by NTD thermistors

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Reaching a complete understanding of thermal signal pulse formation in low-temperature calorimeters can contribute to the improvement of their performance, both in the identification of low energy events and in the optimized choice of geometry and materials for future experiments.

We performed dedicated measurements with TeO_2 crystals read-out by Ge-NTDs hosted in copper and PMMA holders. Analyzing the data at different temperatures (from 10 to 30 mK), we identified the main physical parameters which determine the thermalization processes. The different materials of the two holders strongly affect how the calorimeters are linked to the thermal bath, playing a crucial role in the resulting shape and characteristic times of the thermal pulses, which are different for the two frames. We are developing a model able to describe and predict the pulse shapes in terms of the thermal capacities and conductances of the different systems. Current results are encouraging.

TIPP2020 abstract resubmission?

No, this is an entirely new submission.

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