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Impact of marine macroseisms on the response of the CUORE cryogenic calorimeters

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CUORE is a ton-scale experiment, consisting in an array of 988 cryogenic calorimeters, designed for the search of the neutrinoless double beta ($0\nu\beta\beta$) decay of ^{130}Te. One of the crucial parameters in defining the sensitivity to such a rare event is the detectors energy resolution.
CUORE is taking data since 2017. During the years, we observed that the energy resolution is influenced by a low-frequency seismic noise, which contributes in the same bandwidth of particle signals.

This contribution will report a novel multi-detector analysis involving CUORE cryogenic detectors, in-situ high-sensitivity seismometers and marine measurements in the Mediterranean Sea, highlighting the correlation between the noise of CUORE detectors below 1 Hz and marine microseismic events.
Such correlation induces changes of the low-frequency noise of the detectors when weather and marine conditions of the Mediterranean Sea change.
The study of the response of CUORE detectors to marine microseismic events opens the possibility to an improvement of the seismic suspension system of the CUORE cryostat, which will be used also by CUPID, the next-generation cryogenic experiment for $0\nu\beta\beta$ decay searches.

Submitted on behalf of a Collaboration?

Yes

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