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Recent results from the ECHO experiment

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The Electron Capture in ^{163}Ho experiment (ECHO) is a running experiment for the determination of the neutrino mass scale via the analysis of the end point region of the ^{163}Ho electron capture spectrum. In the first phase, called ECHO-1k, data was collected for several months with about 60 metallic magnetic calorimeter (MMC) pixels enclosing ^{163}Ho for an activity of about 1Bq per pixel.

The goal of this first phase is to reach a sensitivity on the effective electron neutrino mass below $20 \text{ eV}/c^2$ by the analysis of a ^{163}Ho spectrum with more than 10^8 events and to demonstrate the potential to upscale the ECHO technology to a substantially more sensitive experiment in a next phase. Results from the analysis of the acquired data will be presented with focus on data reduction efficiency and on the procedures to obtain the final high statistics spectrum. A preliminary analysis of the ^{163}Ho spectral shape will be described and the expected sensitivity on the effective electron neutrino mass, on the basis of the properties of the presented spectrum, will be discussed.

We will then present how the performance obtained by the detectors during ECHO-1k have led to the development of an optimized detector system for the second phase, ECHO-100k. In ECHO-100k about 12000 MMC pixels each hosting ^{163}Ho for an activity of 10 Bq will be simultaneously operated. A sensitivity on the effective electron neutrino mass at the $1 \text{ eV}/c^2$ level will be reached with three years of data acquisition.

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In-person participation

Yes

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