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Calorimetric measurement of the ^{163}Ho spectrum in ECHO

The Electron Capture ^{163}Ho experiment (ECHO) will investigate the electron neutrino mass in the sub-eV range by the kinematical analysis of the calorimetrically measured ^{163}Ho spectrum. Low temperature metallic magnetic micro-calorimeters with ^{163}Ho embedded in the absorber will be used for this experiment.

We have performed a series of preliminary tests with two magnetic micro-calorimeters having ^{163}Ho ions implanted in the absorber. The electron capture spectrum of ^{163}Ho that we have measured is presently the most accurate one showing an energy resolution of $\Delta\text{EFWHM} = 7.6$ eV. The measured signal rise time is as fast as $\tau = 130$ ns. We discuss the performance of single pixels and the analysis of the measured ^{163}Ho spectrum.

For the next middle-scale experiment we have developed a novel 64-pixel detector consisting of two 32-pixel arrays which are read-out by means of the microwave multiplexing technique. We present the new detector design, describe the read-out scheme and discuss the achievable performance.

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