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Development and optimisation of metallic magnetic calorimeter arrays towards ECHo-100k

The Electron Capture in ^{163}Ho (ECHo) experiment has been designed for the determination of the effective electron neutrino mass exploiting the electron capture spectrum of ^{163}Ho . The detector technology is based on metallic magnetic calorimeters (MMCs) loaded with ^{163}Ho and operated at millikelvin temperature. For the coming phase of the experiment, ECHo-100k, the planned activity per pixel is 10 Bq and the required number of pixels simultaneously operated will be 12000. Therefore, a new dedicated chip design has been prepared and microfabricated in order to improve detector performances, ^{163}Ho implantation efficiency and to allow for parallel and multiplexed read-out. The detector geometry and the ^{163}Ho host material have been studied in order to optimise the detector response and the energy resolution. In this contribution we present the new ECHo-100k design and the first results obtained with an external ^{55}Fe source.

Mini-abstract

The new 64-pixel MMC detector arrays meet the requirements for the next phase of the ECHo experiment

Experiment/Collaboration

ECHo collaboration

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