

HOLMES, an experiment for a direct neutrino mass measurement

Measuring the neutrino mass is one of the most compelling challenges of modern physics.

HOLMES is a new experiment recently founded by the European Research Council to directly measure the neutrino mass. HOLMES will perform a calorimetric measurement of the energy released in the electron capture decay of ^{163}Ho in order to reach a sensitivity as low as 0.4 eV on the neutrino mass. HOLMES will deploy a large array of low temperature microcalorimeters with implanted ^{163}Ho nuclei in a Bismuth-Gold absorber coupled to a Transition Edge Sensor.

The R&D activities necessary to optimize the ^{163}Ho isotope production, the source embedding, the detector optimization and the multiplexed readout, are already in progress. We outline here the project with its technical challenges and perspectives.

Summary

HOLMES is a new experiment aiming to measure the electron neutrino mass from the electron capture decay spectrum of ^{163}Ho with sub-eV sensitivity. In order to reach a sensitivity of 0.4 eV a large array of 1000 low temperature microcalorimeters will be operated starting from 2016 for three years time.

Tags: HOLMES, neutrino mass direct measurement, ^{163}Ho electron capture.

Author: PUIU, andrei (INFN)

Presenter: PUIU, andrei (INFN)