

## The Electron Capture in $^{163}\text{Ho}$ Experiment

*Tuesday 25 July 2017 14:45 (15 minutes)*

The Electron Capture in  $^{163}\text{Ho}$  (**ECHO**) experiment is designed to investigate the electron neutrino mass  $m_{\nu_e}$  with sub- $eV$  sensitivity by the analysis of the electron capture (**EC**) energy spectrum of  $^{163}\text{Ho}$ .

The sensitivity on the electron neutrino mass is crucially related to the energy available for the decay  $Q_{EC} = 2833(30\text{stat})(15\text{sys}) eV$ , which has been precisely determined by the ECHO collaboration.

Accordingly, a sensitivity below  $10 eV$  is expected to be attained at the end of the present phase of the experiment, ECHO-1k.

In this phase, about  $1 kBq$  of high purity  $^{163}\text{Ho}$  is going to be implanted in multiplexed arrays of low temperature metallic magnetic calorimeters which are operated in a reduced background environment.

The goals of ECHO-1k are the precise characterization of the parameters describing the spectrum, optimizing the implantation process of  $^{163}\text{Ho}$  into the detector arrays, optimization of detector production and identification and reduction of the background in the experimental setup.

The results will pave the way to a future phase of the experiment, where activities of the order of  $MBq$   $^{163}\text{Ho}$  will be used.

This second phase aims to approach sub- $eV$  sensitivity on the electron neutrino mass.

Furthermore, the high statistics and high resolution measurement of the  $^{163}\text{Ho}$  electron capture spectrum will allow the investigation of the existence of  $eV$  and keV-scale sterile neutrinos.

In this contribution, a general overview of the ECHO experiment is presented and the current status as well as the future perspectives are discussed.

**Author:** Dr SCHOLL, Stephan (Kepler Center for Astro- and Particle Physics)

**Presenters:** Dr SCHOLL, Stephan (Kepler Center for Astro- and Particle Physics); FOR THE ECHO COLLABORATION

**Session Classification:** Neutrino Parallel

**Track Classification:** Neutrinos