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The Electron Capture 163Ho experiment ECHo

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The determination of the absolute scale of the neutrino masses is one of the most challenging questions in particle physics. Different approaches are followed to achieve a sensitivity on neutrino masses in the sub-eV range. Among them, experiments exploring the beta decay or electron capture of suitable nuclides can provide necessary information on the electron neutrino mass value. In this talk we present the Electron Capture 163Ho experiment ECHo, which aims to investigate the electron neutrino mass in the sub-eV range by means of the analysis of the calorimetrically measured energy spectrum following the electron capture process of 163Ho. A high precision and high statistics spectrum will be measured with arrays of metallic magnetic calorimeters. We discuss some of the essential aspects of ECHo to reach the proposed sensitivity: detector optimization and performance, multiplexed readout, 163Ho source production and purification, as well as a precise theoretical and experimental parameterization of the calorimetric EC spectrum including in particular the value of Q_EC. We present preliminary results obtained with a first prototype of single channel detectors as well as a first 64 pixel chip with integrated microwave SQUID multiplexer, which will already allow to investigate m_ve in the eV range.

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