



Friday 8 July, 12:20 – 12:45

Session 14: Neutrino properties II: searches for neutrinoless double beta decay (continued) and direct mass measurements

**Direct mass searches: KATRIN and Project 8 and searches with Holmium**

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Precision measurements of the kinematics of weak processes – such as beta decay of tritium or electron capture in  $^{163}\text{Ho}$  – offer the only model-independent (direct) approach to investigate the absolute neutrino mass scale in a laboratory experiment. This presentation reviews the current status of direct neutrino mass searches and gives an overview of future experiments. The most mature technique relies on the spectroscopy of tritium beta decay near its kinematic endpoint at 18.6 keV. The Karlsruhe Tritium Neutrino experiment (KATRIN) is targeted at improving the sensitivity of this method by an order of magnitude to  $200 \text{ meV}/c^2$  (90% C.L.). To this end, KATRIN utilises an ultra-luminous windowless gaseous tritium source and a high-resolution electrostatic spectrometer. The experiment is currently in its commissioning phase at the Karlsruhe Institute of Technology. At the same time, novel approaches studying the electron capture spectrum in  $^{163}\text{Ho}$  with cryogenic microcalorimeters (notably, ECHO, HOLMES, and NuMECS), or developing innovative techniques for tritium beta spectroscopy using radio-frequency detection of single electrons (Project 8) are gaining momentum. Experiments exploiting these new techniques are currently in the conceptual design and prototype characterisation phases, with the aim of developing these complementary methods further towards a sub-eV sensitivity on the neutrino mass.