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Update on the HOLMES experiment to directly measure the neutrino mass

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The absolute neutrino mass is still a missing parameter in the modern landscape of particle physics. The HOLMES experiment aims at exploiting the calorimetric approach to directly measure the neutrino mass through the kinematic measurement of the decay products of the weakly-mediated decay of 163Ho. This low energy decaying isotope, in fact, undergoes electron capture emitting a neutrino and leaving its daughter nucleus, 163Dy*, in an atomic excited state. This, in turn, relaxes by emitting electrons and, to a considerably lesser extent, photons. The high energy portion of the calorimetric spectrum of this decay is affected by the non-vanishing neutrino mass value. Given the small fraction of events falling in the region of interest, to achieve a high experimental sensitivity on the neutrino mass it is important to have a high activity combined with a very small undetected pile-up contribution. To achieve these targets, the final configuration of HOLMES foresees the deployment of a large number of 163Ho ion-implanted TESs characterized by an ambitiously high activity of 300 Hz each. This contribution will provide an overview on the status of the major tasks that will bring HOLMES to achieve a statistical sensitivity on the neutrino mass as low as 2 eV: from the isotope production and embedding to the detector production and readout.

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