



Measurement of the heat capacity of Ho implanted Au film for the HOLMES experiment

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HOLMES is a project funded by the European Research Council aiming to realise the calorimetric measurement of the neutrino mass from the electron capture spectrum of ^{163}Ho . HOLMES will deploy a first large Kilo-pixel large array of low temperature microcalorimeters containing about $18\ \mu\text{g}$ of implanted ^{163}Ho nuclei. The resulting mass sensitivity of the pilot experiment will be as low as 0.4 eV.

The total activity will be given by about $6.5 \cdot 10^{16}$ ^{163}Ho nuclei, that allows to achieve a neutrino mass sensitivity as low as 0.4 eV.

However the relatively high concentration of holmium ($J = 7/2$) could cause an excess heat capacity in the metallic absorber, due to hyperfine level splitting of the implanted ion.

Preliminary measurements have been already carried out in the framework of the precursor MARE project to assess the gold absorber heat capacity at $T < 150\ \text{mK}$, both with Ho and Er implanted ions. Even though those tests did not show substantial heat capacity excess, further more sensitive investigations are being carried out in the framework of the HOLMES project for a fine tuning of the calorimeter heat capacity. We present the first heat capacity measurement comparison between gold film on Si not implanted reference sample and one with more than 10^{15} Ho^+ implanted ions.