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163Ho implantation in TES-based micro-calorimeters for the HOLMES experiment.

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The HOLMES experiment aims to directly measure the ν mass studying the 163Ho electron capture decay spectrum, developing arrays of TES-based micro-calorimeters implanted with O(102 Bq/detector) ^{163}Ho atoms. The ^{163}Ho embedding inside detectors is a crucial step of the experiment. Because ^{163}Ho is produced by neutron irradiation of a ^{162}Er sample, the source must be separated from a lot of contaminants. A chemical process removes every species other than Ho, but it is not sufficient to remove all background sources: in particular, ^{166m}Ho beta decay can produce fake signal in the region of interest. For this reason a dedicated implantation / beam analysis system has been set up and commissioned in Genoa's laboratory. It is designed to achieve more than 5σ separation @163/166 a.m.u. simultaneously allowing an efficient Ho atoms embedding in the absorbers. The machine performances in terms of achievable current, beam profile and mass separation have been studied with MonteCarlo simulations and evaluated by means of calibration runs using Cu, Mo, Au and 165Ho beams. In this work, the commissioning of the machine and the production of the first set of low activity (O(1Bq/detector)) implanted TES will be described.

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