Contribution ID: **267** Type: **Poster**

The Holmes ion implanter commissioning runs

Tuesday, 18 October 2022 16:36 (1 minute)

The HOLMES experiment aims to measure directly the neutrino mass with a calorimet- ric approach studying the end point of the 163Ho electron-capture decay spectrum. This isotope is produced via neutron capture by 162Er and its very low Q-value (2.8 keV) makes it a very good choice but introduces two critical aspects. The first one is the need to embed the isotope inside the cryogenic microcalorimeters so that the energy released in the decay process is entirely contained within the detectors, except for the fraction taken away by the neutrino. The second one is the rejection of 166mHo radioactive isotope, created from impurities during the neutron irradiation, that could produce false signal in the region of interest. So a dedicated implanter with a sputter ion source, an acceleration section (up to 50 keV) and a magnetic dipole (for ion selection and beam focusing) has been designed and developed. Different targets for the implanter ion source have been also developed in collaboration with Genoa Chemistry Department and PSI (Paul Scherrer Institute). This work will show the status of the machine development and the results on the different target solutions.

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Session Classification: BBQ - Drinks & Posters