MAT Science Week
April 24-27, 2018 at GSI, Darmstadt

Beitrag ID: **50** Typ: **Oral**

Production and Characterization of the 163Ho Source for the ECHo Project

Dienstag, 24. April 2018 15:00 (20 Minuten)

The ECHo (Electron Capture in Holmium Experiment) collaboration aims at measuring the electron neutrino mass by recording the spectrum following electron capture of 163Ho using metallic magnetic calorimeters. The radioisotope 163Ho (t1/2 = 4570 a) is produced by neutron capture from enriched 162Er in the Institute Laue-Langevin high-flux nuclear reactor. After chemical separation the important step of embedding the sample into the 180x180 ☒m2 Au-absorbers of the ECHo detectors is carried out by laser mass spectrometric techniques. The application of multi-step resonance ionization at the 60 kV RISIKO mass separator of Mainz University ensures highest efficiency and unrivalled elemental and isotopic selectivity for ultra-pure 163Ho ion implantation with sub-millimeter beam spot. The efficiency and stability of the laser ion source and the implantation process is permanently monitored and improved to minimize any losses of the precious sample material, while an in-situ deposition of gold by parallel pulsed laser deposition (PLD) ensures a homogeneous 163Ho/Au layer production and prevents disturbing sputter effects. To screen the purity of the source from production up to use besides a number of more conventional analytical techniques accelerator mass spectrometry (AMS) of Ho at the AMS-facility of the Helmholtz-Zentrum Dresden-Rossendorf is under development to address the very low content in the 10-9 or lower region of the radiocontaminating isotope 166mHo (t1/2 = 1200 a).

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