Contribution ID: **403** Type: **Poster**

Innovative technique for large scale production of W-TES

Thursday, July 25, 2019 6:45 PM (15 minutes)

A superconducting transition edge sensor (TES) is used as an ultrasensitive thermometer to measure temperature changes in the range of μK. In the framework of the CRESST experiment (Cryogenic Rare Events Search with Superconducting Thermometers); which is a direct dark matter detection experiment, tungsten TESs are used as the sensing element. Detectors in CRESST are constituted, in brief, of a target crystal with a mass of a few tens of grams. These detectors are operated as cryogenic calorimeters at ~10 mK. The main detection channel is nuclear scattering of hypothetical dark matter particles (or background radiation) inside the target crystal. The deposited energy is then converted into heat leading to a measurable temperature rise in the temperature sensor.
To cope with the foreseen demand for TES, in the current and future phases of the experiment, we investigated the possibility to implement a reliable, simple and reproducible fabrication method using a conventional sputtering system. In the contribution we will present the method under development for tungsten-based TESs using conventional magnetron sputtering with xenon as sputtering gas. TESs with Tc down to 15 mk have been obtained with transition width smaller than 1 mk. We will also give a first assessment on the reproducibility of the process and present the potential for the tuning of Tc.

Less than 5 years of experience since completion of Ph.D

Y

Student (Ph.D., M.Sc. or B.Sc.)

Y

Primary author: Mr ABDELHAMEED, Ahmed H. (Max Planck Institute for Physics)

Co-authors: BENTO, Antonio (Max Planck Institut für Physik); HAUFF, Dieter; BERTOLDO, Elia; PETRICCA, Federica (Max-Planck-Institut für Physik); PRÖBST, Franz; ROTHE, Johannes (Max-Planck-Institut für Physik); CANONICA, Lucia; MANCUSO, Michele (Max-Planck-Institut für Physik); Dr FERREIRO IACHELLINI, Nahuel; BAUER, Philipp (Max Planck Institut für Physik)

Presenter: Mr ABDELHAMEED, Ahmed H. (Max Planck Institute for Physics)

Session Classification: Poster session

Track Classification: Low Temperature Detector fabrication techniques and materials