

An R&D of Molybdate scintillating crystals for the AMoRE phase-II

Friday, July 6, 2018 8:15 PM (15 minutes)

The AMoRE (Advanced Molybdenum based Rare process Experiment) project is an experiment aiming for searching the neutrinoless double beta decay of ^{100}Mo . The planned technique is a combination of 200 kg of X-Molybdates (~100 kg of ^{100}Mo and X candidates are Ca, Li, Na, and Pb.) scintillating crystals as an absorber and metallic magnetic calorimeter (MMC) sensor as a heat and light signal detector at mK temperatures.

1.8 kg of $^{40}\text{Ca}^{100}\text{MoO}_4$ (^{48}Ca depleted, ^{100}Mo enriched) scintillating crystals are currently installed in the AMoRE-pilot experiment and two candidate crystals, Na_2MoO_7 and Li_2MoO_4 , have been being investigated for the large scale experiment with their easiness in crystal growth and internal background control.

The AMoRE phase-II with 200 kg of molybdate crystals aims to reach the range of the inverted neutrino mass hierarchy for an effective Majorana neutrino mass sensitivity of $10\sim 30$ meV which can be obtained by a zero background ($\sim 1 \times 10^{-4}$ count/keV/kg/y in total) experiment. In order to obtain the mass sensitivity, the internal background levels of the crystal are estimated to be less than $15 \mu\text{Bq/kg}$ for ^{226}Ra and $1.5 \mu\text{Bq/kg}$ for ^{228}Th .

We will report the current status of the R&D of molybdate crystals for the AMoRE phase-II.

Primary author: Dr SO, Jungho (Center for Underground Physics)

Co-authors: Mr LEE, Chulho (Center for Underground Physics); Mr HA, Daehoon (Kyungpook National University); Mr KIM, Daeyeon (Center for Underground Physics); Dr LEONARD, Douglas (Center for Underground Physics); Dr JEON, Eunju (Center for Underground Physics); Mrs LEE, Eunkyung (Center for Underground Physics); Prof. KIM, Hongjoo (Kyungpook National University); Prof. PARK, Hyangkyu (Korea University); Mrs KIM, Hyeelim (Kyungpook National University); Mr LEE, Jooyoung (Kyungpook National University); Mr SON, Jukyung (Center for Underground Physics); Mr CHOI, Junseok (Center for Underground Physics); Mrs SHIN, Keonah (Center for Underground Physics); Dr LEE, Moohyun (Center for Underground Physics); Dr GILEVA, Olga (Center for Underground Physics); Mr RA, Sejin (Center for Underground Physics); Dr KANG, Woongu (Center for Underground Physics); Prof. KIM, Yeongduk (Center for Underground Physics); Dr KIM, Yonghamb (Center for Underground Physics); Dr YOON, Youngsoo (Center for Underground Physics)

Presenter: Dr SO, Jungho (Center for Underground Physics)

Session Classification: POSTER