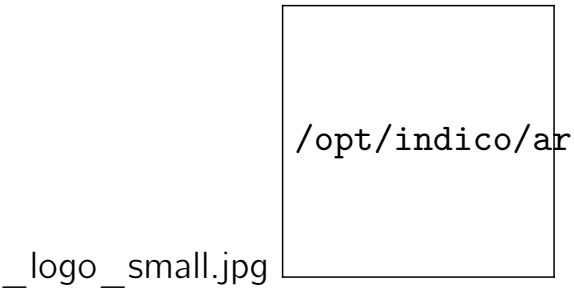

Contribution ID : **52** Type : **Contributed Oral**

archPbMoO4 scintillating bolometers as detectors to search for the neutrinoless double beta decay of 100Mo

Wednesday, 1 March 2017 18:00 (0:20)

Content

To effectively detect elusive particles the use of a detector with high efficiency and enhanced sensitivity is required. Cryogenic scintillating bolometers are among the most promising detectors used for the investigation of rare nuclear processes due to their excellent background rejection capabilities thanks to the simultaneous and independent, double readout of heat and scintillation light induced by particle interaction in the crystal. The main goal of the CUPID-0 experiment is to demonstrate the feasibility of using scintillating bolometers to search for the neutrinoless double beta decay of several perspective isotopes (82Se, 100Mo, 116Cd and 130Te). 100Mo is among them due to its high energy transition (Qbb = 3035 keV), comparably high natural isotopic abundance (9.67%), possibility to be highly enriched by the ultra-speed gases centrifuges technology (up to 99.5%) and a reasonable price for such type of enrichment. Different molybdenum-based crystals were tested in the last decade for their potential application as scintillating bolometers. Among them, the most promising are Li2MoO4, CaMoO4 and ZnMoO4. Despite of a significant progress in their development, there are a number of challenges to be met, mainly caused by the high internal radioactive contamination and difficulties in the high quality large volume crystal production. However, many of these problems can be omitted in case of PbMoO4 crystal produced from archaeological lead. Here we present results on the archPbMoO4 crystal performance produced from archaeological lead, as a promising scintillating bolometer to search for the neutrinoless double beta decay of 100Mo. For this purpose the archPbMoO4 crystal has been characterized by chemical and optical methods, and by means of cryogenic measurements.

Summary

Primary author(s) : Dr. NAGORNY, Serge (Gran Sasso Science Institute)

Co-author(s) : Dr. DAFINEI, Ioan (INFN - Sezione di Roma I); Dr. KOSMYNA, Michail (Institute for Single Crystals of NAS of Ukraine); Dr. NAZARENKO, Boris (Institute for Single Crystals of NAS of Ukraine); Dr. NISI, Stefano (INFN - Laboratori Nazionali del Gran Sasso); Mr. PAGNANINI, Lorenzo (Gran Sasso Science Institute); Dr. PATTAVINA, Luca (INFN - Laboratori Nazionali del Gran Sasso); Dr. PIRRO, Stefano (INFN - Laboratori Nazionali del Gran Sasso); Dr. SCHÄFFNER, Karoline (Gran Sasso Science Institute); Dr. SHEKHOVTSOV, Alexey (Institute for Single Crystals of NAS of Ukraine)

Presenter(s) : Dr. NAGORNY, Serge (Gran Sasso Science Institute)

Session Classification : Instrumentation for Astroparticle and Neutrino physics

Track Classification : Instrumentation for Astroparticle and Neutrino physics