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CHARACTERISATION OF SCINTILLATION CRYSTALS FOR CRYOGENIC EXPERIMENTAL SEARCH FOR RARE EVENTS

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During the last decade there has been a steady increase in the research activity towards the developments of new scintillation materials for their use in the cryogenic detectors. These detectors play important role in the experiments searching for rare events, such as Dark Matter, and neutrinoless ⊠double beta decay. There is need in variety of scintillation targets and therefore the measurement of the scintillation characteristics at low temperatures is an important objective allowing to assess the suitability of the material for cryogenic applications.
Relative intensity and scintillation decay kinetics were studied in CaWO4, CaMoO4, ZnWO4, ZnMoO4, PbWO4, PbMoO4, MgWO4, ZnSe, and LiF(W) crystal scintillators over the temperature range 7 –310 K. Samples of the crystals 5⊠1 mm of size were placed into an optical cryostat and excited with an 241Am alpha-source. The measurements where carried out using the multiple photon counting technique and a green sensitive photo-multiplier as a detector. The following values of relative intensity were obtained at the temperature T=7 K (prior spectral correction): CaWO4 (100%), ZnWO4 (77%), ZnSe (61%), CaMoO4 (46%), PbWO4 (24%), PbMoO4 (21%), MgWO4 (15%), LiF(W) (<5%), and ZnMoO4 (<5%).

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