Contributed Talk

Results of Quenching Factor Measurements of $CaWO_4$ at mK Temperatures for the Direct Dark Matter Search Experiment CRESST

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The CRESST experiment aims towards a direct detection of WIMP Dark Matter using scintillating $CaWO_4$ crystals operated as phonon detectors at mK temperatures. A peculiar feature of the experiment is the active background discrimination technique exploiting the different light outputs depending on the kind of particle interaction. The reduced light yield of nuclear recoils compared to electron recoils is quantified by Quechning Factors (QFs). The precise measurement of the QFs and thus the identification of the individual recoiling nucleus in the multitarget material $CaWO_4$ is crucial for neutron background discrimination and would -assuming a positive Dark Matter signal- allow to a certain extent "WIMP-mass spectroscopy". At the Munich Tandem Accelerator (MLL) a dedicated neutron scattering facility has been set up to measure the QFs of $CaWO_4$ - in particular that of tungsten - at mK temperatures. Monoenergetic neutrons (11 MeV) produced by the accelerator are scattered off a CRESST-like detector module that is operated in a dilution refrigerator. In this setup the recoiling nucleus (Ca,W or O) is identified by time-of-flight measurement in liquid scintillator detectors placed at fixed scattering angles. We present the final results of the QF measurements and report on the potential of CRESST as an unique multi-material target experiment.