



Study of infrared scintillations in gaseous and liquid argon - Part I: methodology and time measurements

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A methodology to measure Near Infrared (NIR) scintillations in gaseous and liquid Ar, using Geiger-mode APDs (GAPDs) sensitive in the NIR and pulsed X-ray irradiation, is described. This study has been triggered by the development of Cryogenic Avalanche Detectors (CRADs) with optical readout in the NIR using combined THGEM/GAPD multiplier, which may come to be in demand in coherent neutrino-nucleus scattering and dark matter search experiments. A new approach to measure the NIR scintillation yield at cryogenic temperatures has been developed, namely using GAPDs in single photoelectron counting mode with time resolution. The time structure of NIR scintillations and their light yield were measured both for primary scintillations and that of secondary at moderate electric fields (electroluminescence), in gaseous and liquid Ar.

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