



Contribution ID: 77

Type: **not specified**

## Two-phase Cryogenic Avalanche Detectors in Ar with THGEM/GAPD-matrix optical readout

*Wednesday, 3 July 2013 11:40 (25 minutes)*

Two-phase Cryogenic Avalanche Detectors (CRADs) with THGEM multipliers have become an emerging technique for rare-event experiments. In this work the performance of two-phase CRADs in Ar with THGEM/GAPD-matrix optical readout has for the first time demonstrated in terms of high spatial resolution and low detection threshold. Here the double-THGEM charge multiplier was combined with a 3x3 matrix of Geiger-mode APDs (GAPDs), optically recording THGEM-hole avalanches in the Near Infrared (NIR). The charge and light yields and the spatial resolution of such a combined THGEM/GAPD-matrix multiplier have been measured in the two-phase Ar CRAD. The effect of decreasing the GAPD rate capability at cryogenic temperature has been revealed in the course of the measurements. This effect was systematically studied and partially overcome by applying a dedicated peak-counting algorithm for GAPD signal processing. The applicability of such a technique to dark matter search and coherent  $n\bar{n}$  neutrino-nucleus scattering experiments, in terms of providing ultimate (single-electron) sensitivity at higher (sub-cm) spatial resolution, is discussed.

**Presenter:** SOKOLOV, Andrey (Ecole Polytechnique)

**Session Classification:** Wednesday (MPGD mid-morning session)