



Contribution ID: 1

Type: **Talk**

Cryogenic Readout Electronics for a MPPC Based Array Operating at Liquid Xenon Temperature

Friday, 15 June 2018 09:35 (20 minutes)

We present the performances and characterization of an array made of Hamamatsu S13370-3050CN (VUV4 generation) Multi-Pixel Photon Counters for the detection of VUV scintillation light in liquid xenon based applications. The array is readout as a single channel and it is capable of single photon detection making the device a promising option for future generation of neutrino and dark matter detectors based on liquid xenon targets.

The electronics board encloses a low power consumption preamplifier stage, operating at liquid xenon temperature. In the present configuration, a single operational amplifier serves 16 individual MPPCs (corresponding to 1.44 cm² of active surface) forming a macro cell. The electronics is capable to readout up to 4 macrocells.

The operational amplifier selected for the realization of the prototype is the current feedback Analog Devices AD8011. The layout does not prevent the use of different models in case of higher performance requirements or for operations at lower temperatures.

A biasing correction circuit, based on Digital To Analog Converters suitable for cryogenic applications, is used for the gain equalization of photosensors with different breakdown voltages.

Detector characteristics, noise analysis and performance will be discussed along with the preliminary radioactivity screening assessment of the preamplifier unit.

Primary author: Dr DI GIOVANNI, Adriano (New York University Abu Dhabi)

Co-authors: Dr CANDELA, Attanasio (Gran Sasso National Laboratory - INFN); Prof. ARNEODO, Francesco (New York University Abu Dhabi); Dr BRUNO, Gianmarco (New York University Abu Dhabi); Dr FRANCHI, Giovanni (AGE scientific SRL); Dr MESSINA, Marcello (New York university Abu Dhabi); Prof. BENABDER-RAHMANE, Mohamed Lotfi (New York University Abu Dhabi); Dr FAWWAZ, Osama (New York university Abu Dhabi)

Presenter: Dr DI GIOVANNI, Adriano (New York University Abu Dhabi)

Session Classification: Cryogenic Properties

Track Classification: Cryogenic Properties