Contribution ID: **424** Type: **Poster**

An Imaging Calorimeter prototype with WLS fibers and LYSO crystal

Wednesday, 29 May 2024 08:48 (1 minute)

An imaging calorimeter prototype for the new generation of satellite experiments sensitive to sub-GeV photons is proposed. The detector is composed of a thin scintillator crystal of LYSO coupled with two crossed planes of wavelength shifting fibers (WLS) on its top and bottom faces, readout by Silicon Photomultipliers (SiPMs). Ionizing particles and absorbed gamma rays will leave energy deposits in the crystal and scintillation light will be isotropically produced. WLS fibers subtended by the acceptance cone corresponding to total internal reflection angle will collect the light that will be delivered to SiPM arrays at their ends. Crossed fiber planes allow evaluation of the position of the interaction point in the scintillator crystal. A custom front-end board hosting four PETIROC 2A ASICs was designed in INFN Bari for reading-out the signals from SiPMs.

WLS fibers are suitable for airborne and satellite-borne detectors due to their light weight, flexibility, and low cost. In addition, using SiPMs instead of common photomultiplier tubes (PMTs) for the read-out of scintillation light will reduce the power consumption. A first module prototype was assembled and tested in our laboratories with a Sr-90 radioactive source and cosmic-ray muons and at the CERN PS and SPS facilities with beams of pions and nuclei. Preliminary results will be presented in this contribution.

Collaboration

Role of Submitter

I am the presenter

Primary authors: LIGUORI, Antonio (Istituto Nazionale di Fisica Nucleare); LOPARCO, Francesco (Istituto Nazionale di Fisica Nucleare); PANZARINI, Giuliana (Istituto Nazionale di Fisica Nucleare); LORUSSO, Leonarda (INFN - Bari); GILIBERTI, Mario (Istituto Nazionale di Fisica Nucleare); MAZZIOTTA, Mario Nicola (Istituto Nazionale di Fisica Nucleare); PILLERA, Roberta (Politecnico and INFN Bari)

Presenter: LORUSSO, Leonarda (INFN - Bari)

Session Classification: Calorimetry - Poster session

Track Classification: T4 - Calorimetry