Contribution ID: **25** Type: **not specified**

Liquid argon scintillation read-out with silicon devices

Wednesday, 29 May 2013 12:45 (25 minutes)

Silicon photosensors actually represent a viable alternative to standard photomultipliers in fields such as communications and medical imaging. We explored the interesting possibility of using these sensors in combination with liquid Argon (LAr) for astroparticle physics applications such as neutrino, dark matter and double beta decay experiments. In fact, silicon photosensors have detection efficiencies comparable with those of the most performing PMTs and can be manufactured with high level of radiopurity.
In particular within the on-going R&D activity of the SILENT project (Low background and low noise techniques for double beta decay physics funded by ASPERA) a large area SiPM (Hamamatsu S11828-3344M – 1.7 cm^2 area) has been installed in a LAr scintillation chamber of 0.7 liters volume together with a cryogenic photomultiplier tube (Hamamatsu R11065) used as a reference. The LAr chamber has been exposed to many gamma sources of different energies and single photoelectron response and light yield for the SiPM and PMT have been measured and compared.
In this contribution the results of the tests, the ongoing R&D to optimize the SiPM for cryogenic and for ultralow backgrounds applications, will be presented, as well as the possible application in the GERDA experiment on Double Beta Decay Searches of Ge-76.

Primary authors: Dr MACHADO, Ana (INFN-LNGS); Dr CATTADORI, Carla (INFN); Dr VIGNOLI, Chiara (INFN); Dr SEGRETO, Ettore (INFN-LNGS); Dr CANCI, Nicola (UCLA & INFN-LNGS); Dr RIBOLDI, Stefano (INFN)

Co-authors: Mr SABLONE, Davide (INFN-LNGS); Mr D'INCECCO, Marco (INFN-LNGS)

Presenters: Dr SEGRETO, Ettore (INFN-LNGS); Dr CANCI, Nicola (UCLA & INFN-LNGS)

Session Classification: Scintillation Light from Noble Elements - R&D Efforts