Contribution ID: **71** Type: **Oral/Presentation**

The 'burst' phenomenon in SiPMs at liquid nitrogen temperature

Wednesday 20 November 2024 14:35 (18 minutes)

Burst effect of Silicon Photomultiplier (SiPM) at cryogenic temperatures have been discovered few years ago looking at the dark count rate of SiPMs at liquid nitrogen temperatures. A burst consists in trains of consecutive avalanche events, characterized by a rate that is about 100 times that of the single-event uncorrelated dark counts, and results in an overall increase of the DCR. Burst events start typically with a high-amplitude event (> 4p.e.) and last for tents of millisecond. The number of events in the burst is typically ~ 100 and the amplitude of events contained in the burst are distributed around the single photoelectron (p.e.). Bursts occurs in a few types of SiPM models of Hamamatsu Photonics K.K. (HPK) and Fondazione Bruno Kessler (FBK) when operated at liquid nitrogen (LN2) temperature.
In this work we describe a detailed study related to both the external causes that triggers bursts and to the phenomenon, internal to the sensor, that produces this dark signals. We related the burst occurrence to the luminescence produced by some trapping centers in the SiPMs when they are excited by ionizing radiation that impinges on the sensor.
To study the nature of trapping centers, further investigations are necessary in close synergy with vendors on material compositions and fabrication processes.

Do you need a VISA letter for traveling to Canada ?

No

Author: TOMASSETTI, Luca (Universita e INFN, Ferrara (IT))

Presenter: TOMASSETTI, Luca (Universita e INFN, Ferrara (IT))

Session Classification: Cryogenic and Noble Liquids Detectors (1) (Chair: Masashi Yokoyama, Ryan Underwood)

Track Classification: Detectors: Cryogenic and Noble Liquids Detectors