Contribution ID: **468** Type: **Talk**

SiPM single photon time resolution measured via bi-luminescence

Thursday, 21 February 2019 16:30 (20 minutes)

We present results on measurements of the single photon time resolution on silicon photomultipliers using bi-luminescence. When a silicon photomultipler is biased passed breakdown, each avalanche produces a number of photons as electron-hole pairs recombine. If these photons enter a neighboring cell and trigger an additional avalanche, the process is referred to as optical cross-talk. We refer to bi-luminescence as the process in which one or more of these spontaneously emitted photons escape the device and triggers an avalanche in a different device. Thus, measuring the time difference between the avalanche of the emitter and the absorber results in a measurement of the single photon time resolution each device. For the emitter and absorber, we use identical type SiPMs biased to the same over voltage. The time difference between coincident events in each SiPM gives rise to a double peaked structure, with each peak being fitted with a convolution of a gaussian and exponential distribution, corresponding to the single photon time resolution and afterpulse components, respectively. Measurements are carried out for a range of temperatures to measure the activation energy of the afterpulse component. The extracted single photon time resolution is compared to literature values on comparable devices.

Primary authors: Dr BETANCOURT, Christopher (University of Zurich); Mr DAETWYLER, Alexander (University of Zurich); Dr OWEN, Patrick (University of Zurich); Dr PUIG, Albert (University of Zurich); Prof. SERRA, Nicola (University of Zurich)

Presenter: Dr BETANCOURT, Christopher (University of Zurich)

Session Classification: SiPM

Track Classification: SiPM