Abstract Submitted
for the CAL13 Meeting of
The American Physical Society

Silicon Photomultiplier Characterization[1] LEO OSORNIO, Hartnell College — Silicon Photo Multiples (SiPM's)or Multi-Pixel Photon Counters (MPPC's) are relatively new photon detectors. They offer many advantages compared to photo multiplier tube. The SiPM output wave forms are still poorly understood. The experiment collected waveforms of responses of Hamamatsu SiPM to incident laser pulse at varying temperatures and bias voltages. Ambient noise, coherent and incoherent, was characterized by averaging the waveforms. Pulse shape of the SiPM response was determined under different operating conditions. Amplitude of responses of the SiPM to low intensity laser light shows multiple peaks corresponding to the detection of 1,2,3 etc. photons. Amplitude of these pulses depends linearly on the bias voltage, enabling determination of the breakdown voltage at each temperature. Several methods determining the breakdown voltage have been developed, with the results being very consistent. Breakdown voltage changes with temperature with the slope of about 50 mV/deg C, although a significance deviation from linearity has been observed at temperatures below -100C.Poisson statistics has been used to determine the average number of detected photons at each condition. This number is proportional to the Geiger probability at the given conditions with respect to over voltage

[1]P0315090007 Title V grant

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Date submitted: 07 Oct 2013 Electronic form version 1.4