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Investigation of the Effect of Temperature and Light Emission from Silicon Photomultiplier Detectors[1] DANIEL RUIZ CASTRUITA, DANIEL RAMOS, VICTOR HERNANDEZ, ROMMEL NIDUAZA, ADRIAN KONX, SEWAN FAN, LAURA FATUZZO, Hartnell College, STEFAN RITT, Paul Scherrer Institu — The silicon photomultiplier (SiPM) is an extremely sensitive light detector capable of measuring very dim light and operates as a photon-number resolving detector. Its high gain comes from operating at slightly above the breakdown voltage, which is also accompanied by a high dark count rate. At this conference poster session we describe our investigation of using SiPMs, the multipixel photon counters (MPPC) from Hamamatsu, as readout detectors for development in a cosmic ray scintillating detector array. Our research includes implementation of a novel design that automatically adjusts for the bias voltage to the MPPC detectors to compensate for changes in the ambient temperature. Furthermore, we describe our investigations for the MPPC detector characteristics at different bias voltages, temperatures and light emission properties. To measure the faint light emitted from the MPPC we use a photomultiplier tube capable of detecting single photons. Our data acquisition setup consists of a 5 Giga sample/second waveform digitizer, the DRS4, triggered to capture the MPPC detector waveforms. Analysis of the digitized waveforms, using the CERN package PAW, would be discussed and presented.

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Sewan Fan
Hartnell College

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