

Abstract Submitted
for the APR16 Meeting of
The American Physical Society

Timing Measurements of Scintillator Bars with Silicon Photomultiplier Light Detectors¹ MARK SHELOR, LEONARDO ELIZONDO, Hartnell Community College, STEFAN RITT, Paul Scherrer Institute, Switzerland — To track and analyze cosmic rays via precise measurements of muon and similarly penetrating particle's airshower axes directions, we constructed a prototype consisting of two 1-meter long scintillator bars. Each bar is embedded with green wavelength shifting fibers to increase detection rate of two silicon photomultiplier, SiPM, light detectors to record light produced by cosmic rays via scintillation. The focus of the experiment was to determine the performance of these devices. Evaluation was performed for two makes of SiPM models – from AdvanSiD and Hamamatsu. Timing measurements of the apparatus were performed under several trigger conditions to filter out noise such as coincidence trigger with 2 photomultiplier detectors, as well as SiPM detectors in self-triggered mode. The SiPM detector waveforms were digitized using a 4-channel fast waveform sampler, the DRS4 digitizer. Signals were analyzed with the CERN PAW package. From our results, we deduced the speed of light in the scintillator using the SiPM modules to be about 66% of the speed of light in a vacuum which is in accordance with the specifications of the index of refraction for the fibers given by the manufacturer's specifications. The results of our timing measurements would be presented.

¹Dept. of Ed. Title V grant PO31S090007

Mark Shelor
Hartnell Community College

Date submitted: 08 Jan 2016

Electronic form version 1.4