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Investigation of Very Fast Light Detectors: Silicon Photomultiplier and Micro PMT for a Cosmic Ray Array OMAR CERVANTES, LILIANA REYES, TYLER HOOKS, LUIS PEREZ, Hartnell Community College, STEFAN RITT, Paul Scherrer Institute — To construct a cosmic detector array using 4 scintillation detectors, we investigated 2 recent light sensor technologies from Hamamatsu, as possible readout detectors. First, we investigated several home-made versions of the multipixel photon counter (MPPC) light sensors. These detectors were either biased with internal or external high voltage power supplies. We made extensive measurements to confirm for the coincidence of the MPPC devices. Each sensor is coupled to a wavelength shifting fiber (WSF) that is embedded along a plastic scintillator sheet (30cmx60cmx1/4"). Using energetic cosmic rays, we evaluated several of these home-made detector modules placed above one another in a light proof enclosure. Next, we assembled 2 miniaturized micro photomultiplier (micro PMT), a device recently marketed by Hamamatsu. This sensors showed very fast response times. With 3 WSF embedded in scintillator sheets, we performed coincidence experiments. The detector waveforms were captured using the 5GS/sec domino ring sampler, the DRS4 and our work flow using the CERN PAW package and data analysis results would be presented.

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