



Contribution ID: 75

Type: **Recorded Presentation**

## A light tracker based on scintillating fibers with SiPM readout

We have developed a novel light tracker based on plastic scintillating fiber arrays readout with Silicon Photo-multipliers (SiPMs). The tracker consists of multiple planes, with the fibers in each plane oriented perpendicularly to those in the adjacent plane, in order to allow 3D track reconstruction. The fibers in each plane have round cross sections, with a diameter of 500  $\mu\text{m}$ , and are arranged in two staggered layers in a close-packed configuration. The fibers are readout by means of SiPM arrays with a 250  $\mu\text{m}$  strip pitch placed at one of their ends.

Scintillating fibers allow a reduced material budget while providing a good spatial resolution and a fast response. This design is therefore suitable to track low-energy particles, such as the lowest energy cosmic rays or the electrons produced in Compton scatterings of gamma rays with energies down to 100 keV.

We have built a detector prototype, equipped with Hamamatsu 128-channel SiPM arrays, readout with 32-channel PETIROC2A front-end ASICs. These ASICs are controlled by a custom data acquisition system board equipped with Xilinx Kintex-7 FPGA with self-triggering capabilities. The prototype has been tested with particle beams, cosmic rays and radioactive sources. The tracker design will be presented and performance of the prototype will be discussed.

### Primary experiment

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**Track Classification:** SiPM