ID contributo: **142** Tipo: **Poster**

# High granularity scintillating fiber trackers based on Silicon Photomultiplier

*lunedì 25 maggio 2015 16:22 (0 minuti)*

Scintillating fibers coupled to photosensors provide flexible, fast and high granularity detectors which are able to work in a high rate environment. We will report about the performances obtained with several detector prototypes (single and multi-layers) based on 250 $\mu$m multi clad square scintillating fibers coupled to Hamamatsu SiPMs.
Current measurements show results never reached up to now: very high detection efficiency for minimum ionizing particles already for a single layer ($\geq$ 95%, mean collected light/fiber $\approx$ 8 phe), and full efficiency for multilayer configurations. Spatial resolutions $<$ 100 $\mu m$ and $<$ 50 $\mu m$ are foreseen for single layer and multilayer devices respectively. Such spatial resolutions can be achieved by keeping the optical cross-talk between fibers at a negligible level ($<$ 1%), a level which we have proven to be obtainable when coating the fibers with aluminum. Finally, timing resolutions less than 500 ps have been achieved for m.i.p. double hit events (multilayer configuration). A comparison between the detector performances for m.i.p. and highly ionizing particle (stopped muons) will also be given, showing the possibility of particle identification based on the large difference of the energy deposit on the scintillator by the two particles.

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**Classifica Sessioni:** Photo Detectors and PID - Poster Session

**Classificazione della track:** S2 - Photon Detector and PID