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Study of time response of various detectors

I present a study of the timing properties of various detectors that has been carried on at Bologna INFN laboratories. In particular I have studied the time resolution of Micro Channel Plates (MCP), Silicon PhotoMultipliers (SiPM) and started the characterization of Ultra Fast Silicon Detectors (UFSD). The measurements have been done in a dedicated cosmic ray test stand. The MCP detectors showed good timing properties. The SiPMs, due to their proprieties (compact form, insensitivity to magnetic fields, low voltage power supplies, low cost...), are promising for various scientific applications, from high-energy physics calorimetry/timing/triggering to medical imaging. For these reasons I performed a detailed study of the timing properties of such devices coupled with a scintillator of small dimension. Various couplings to the scintillator (direct or with fibers) and front-end electronics have been used to finally rich a time resolution of about 80 ps.
I also started a research and development activity on Ultra Fast Silicon Detectors (UFSD), which will be characterized by means of Laser, cosmic rays and beam.
I also report the activity in data analysis for the Time of Flight (TOF) of the ALICE experiment. In particular I present results on corrections for time walk effect on the TOF measurements and preliminary study on timing performances with tracks having signals on adjacent readout-pads.

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