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Ultra fast silicon timing detectors: status and future developments

The Ultra Fast Silicon Detectors (UFSD) are a novel concept of silicon detectors based on the LGAD technology, which are able to obtain time resolution of the order of few tens of picoseconds. First prototypes with different geometries (pads/pixels/strips), thickness (300 and 50 μm) and gain (between 5 and 20) have been recently designed and manufactured by CNM (Barcelona) and FBK (Trento). Several measurements have been performed in laboratory and in test beam on these devices. First results on sensor characteristics (leakage current, breakdown voltage, gain/doping profile) and time resolution will be discussed and compared to simulation. The issue of the radiation hardness will be addressed and plan for future productions will be discussed. The expected time resolution, the low material budget and the possibility of segmentation make USFD very interesting candidates for the measurement of the proton time-of-flight in the Precision Proton Spectrometer (CT-PPS). The application of the UFSD in this contest will be discussed.

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