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Progress in Ultra-Fast Silicon Detectors

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We report on the status of the development of Ultra-Fast Silicon Detectors (UFSD). UFSD are novel silicon sensors based on the Low-Gain Avalanche Diodes (LGAD) design and, due to internal gain, exhibit a signal which is a factor of ~ 10 larger than standard silicon detectors. The internal gain allows obtaining fast and large signals, a pre-requisite for time applications, and thus they are poised to extend the use of silicon sensors characterized by excellent position resolution into the precision time domain.

UFSD with the desired gain are being manufactured routinely in a variety of sizes and have been tested in several beam tests-. We will concentrate the discussion on thin LGADs with thickness $< 100\mu\text{m}$, we expect the best time resolution with them, due to the high slew-rate and the small contribution of Landau fluctuations. The results of timing measurements on $75\ \mu\text{m}$ thick LGAD produced by CNM using a beta source will be presented.

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