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Ultra-fast silicon detectors

Ultra-fast silicon detectors are a recent detector type using high resistivity n-on-p wafers and including an extra implantation step to create a high field region that amplifies drifting electrons. The target gain is approximately a factor of ten, allowing high rate operation and good time resolution at the same time as good position resolution is achieved. The best time resolution is expected to be achieved for thin detectors, for example 50 microns thick sensors. This talk will cover how the ultra-fast detectors work, some measurements made to date, and performance expectation based on simulations. Also the extensive prototyping program recently launched to explore the choice of detector parameters will be described. The prototyping program should yield significant new information in the next six months and provide validation for the simulation program that has been developed.

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