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Ultra-Fast Silicon Detectors

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We propose to develop a fast, thin silicon sensor with gain capable to concurrently measure with high precision the space (˜10 µm) and time (˜10 ps) coordinates of a particle.
In collaboration with groups within RD50, we have measured charge multiplication with a gain of about 10, allowing to thin pixelated silicon sensors by at least a factor 10 by keeping the performance of thick sensors. This will open up new application of silicon detector systems in many fields achieve four-dimensional high-precision measurements. We will discuss the basic sensor characteristics and the expected performance, the present status of sensors and readout electronics and discuss the required R&D topics.

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