

# Fast Timing Detectors towards a 4-Dimensional Tracking

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In this contribution, I will review the growing interest in implementing large area fast timing detectors with a time resolution of 30-50 ps, based on Low-Gain Avalanche Detectors.

Precise time information added to tracking brings benefits to the performance of the detectors by reducing the background and sharpening the resolution; it improves tracking performances and simplify tracking combinatorics.

Large-scale high-precision timing detectors have to face formidable changes in almost every aspect: sensors performance, segmentation and radiation tolerance, very low-power and low-noise electronics, cooling, low material budget, and large data volumes.

I will report on the current status and new development of such detectors for high energy physics, in view of their possible use in the experiment upgrades at the High Luminosity LHC.

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