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# A new testing system for multipad RSD sensors based on a a new FAST ASIC

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The development of next-generation silicon sensors is directed towards improving the spatial and temporal resolution of today's particle trackers. To this end, our group in Turin recently developed a solution that features the combination of silicon LGAD (Low Gain Avalanche Detector) sensors with FAST, an integrated device responsible for both amplification and basic processing of the signal. The sensors used in these studies are of the RSD (Resistive Silicon Detector) type, designed in Turin and manufactured by Fondazione Bruno Kessler. Fabricated using 110 nm CMOS technology, the FAST ASIC designed in Torino has temporal resolutions as low as a few tens of picoseconds, all while operating on up to 20 independent channels.

The performance of this detection chain, composed of RSD sensors coupled with FAST, was evaluated using a custom, programmable testing environment developed in the past months. The apparatus uses a short-pulsed laser to generate a signal in the sensor similar to the one released by a particle, as well as a micrometrical x-y stage for sensor positioning and a multichannel data acquisition system based on a high performance digitizer to read the front-end output signals. Thanks to this innovative system both the sensor's and amplifier's behavior can be characterized as a whole, providing useful data for later calibration.

Instrumentation and hardware choices will be presented, as well as the software techniques and workflows that have been developed. Finally, some results obtained from the analysis of data collected using the system will be reported.

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