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Test results of the Timespot1 ASIC on 3D-trench sensors

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We present test results of the hybridized Timespot1 ASIC, developed for 4D-tracking in high luminosity LHC experiments. The ASIC reads a 32x32 pixel matrix bump-bonded on a 3D-type trenched electrode silicon sensor, which already demonstrated intrinsic timing performance and high radiation hardness at test beams, achieving temporal resolutions close to 10 ps. The ASIC is developed in CMOS 28-nm technology and features a fast front-end and high resolution TDC for each of its 1024 channels.

We present the ongoing test activity performed in the laboratory, using both a beta radioactive source and an infrared laser source. Tests are performed with multiple Timespot1 boards connected to a control and data acquisition system based on a commercial Xilinx KC705 FPGA board, and are aimed at a full characterization of the hybrids and at the preparation of test beams planned for the coming months, which will feature a small multi-station 4D-tracking demonstrator.

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