

Tracking charged particles with 30ps timing resolution using the TIMESPOT 3D Silicon Pixels

Thursday, 28 May 2020 14:18 (18 minutes)

The increase in instantaneous luminosity at the HL-LHC experiments will have a severe impact on event reconstruction. Original tracking capabilities could however be restored by measuring tracks with picosecond precision. The TIMESPOT Collaboration is developing innovative 3D pixel with the aim to build a demo mini-tracker using $55\mu\text{m} \times 55\mu\text{m}$ silicon pixels with a time resolution below 50ps. A first sensors' batch was produced in 2019 by FBK in Trento, Italy. Different structures, based on different electrodes geometries, were tested during summer 2019. A high-density trench-type pixel layout was found to be particularly promising from the point of view of timing performances. In this presentation preliminary results on sensors' time resolutions measured both in the laboratory with an infrared pulsed laser and with charged hadrons at the PSI πM1 beamline in October 2019 will be presented. In both tests sensor's time resolutions around 30ps (σ) were routinely measured.

Funding information

INFN, Italy

Primary authors: CARDINI, Alessandro (INFN Cagliari, Italy); (ON BEHALF OF THE TIMESPOT TEAM)

Session Classification: Sensors: Solid-state position sensors

Track Classification: Sensors