

CLIC vertex and tracker sensor studies

Wednesday, 1 June 2016 12:00 (30 minutes)

The physics aims at the future CLIC high-energy linear e+e- collider set very high precision requirements on the performance of the tracking detectors. Moreover, these detectors have to be well adapted to the experimental conditions, such as the time structure of the collisions and the presence of beam-induced backgrounds. A single-point resolution of 3 μm in the vertex detector and 7 μm in the tracker and time slicing at the level of approximately 10 ns have to be achieved. All-silicon vertex and tracking systems meeting these requirements are currently under development. Both hybrid concepts and fully integrated sensors are under consideration. In this talk, test beam studies of planar silicon sensors read out by Timepix3 and CLICpix ASICs are presented. In order to improve the detection efficiency close to the physical edge of the sensor, some of the investigated devices are fabricated with an implanted cut edge (active edge). The experimental results for different edge implementations are compared to T-CAD device simulations. Additionally, in view of a monolithic design for the CLIC tracker, first test beam measurements performed on a small analog CMOS demonstrator pixel chip are presented.

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Session Classification: Vtx and Si Tracking