Contribution ID: **41** Type: **not specified**

4D tracking with thin Resistive Silicon Detectors (RSD2): recent performance studies and future potentials

Wednesday, 30 November 2022 14:05 (20 minutes)

The resistive read-out AC-coupled LGAD sensors are characterized by internal gain and built-in charge sharing, which can be exploited to achieve unprecedented concurrent time and position resolution. We have recently completed the studies of the 4D-tracking capabilities of the second RSD production manufactured at FBK (RSD2).
In this presentation we are summarizing the results obtained for the time and position resolutions, studied with a laser signal, for devices with different design parameters and electrode shapes, and relatively large pitch sizes (200 to 1300 μm range). A position resolution better than 3% of the pixel size is obtained concurrently with a time resolution of ˜35 ps, despite the large collection area of the shared signals.
A comparison with preliminary results from testbeam for one device will be given. Finally an outlook to possible future improvements with DC-coupled RSD.

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Session Classification: New Structures