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Keynote - The Timepix chip family and its latest member, Timepix4

Wednesday, 15 March 2023 16:15 (1 hour)

The Timepix hybrid pixel detector readout chips aim at particle detection and imaging with on-pixel time tagging. Timepix4 is the most recent member of the Timepix family. It can be connected to a sensor with a matrix of 448 x 512 square pixels with a pitch of 55 μ m. Hits are time tagged to within a bin of 200ps. The chip can handle a maximum incoming flux of hits of 3.6 MHz/mm²/s in data-driven mode. It is perhaps the largest hybrid pixel detector readout chip ever produced and is designed such that it can be abutted to neighboring chips on all four sides. This is achieved by a fan-in from a uniform matrix of bump bonding pads to 2 matrices of readout cells with slightly smaller pixel pitch in one direction (51.4 μ m). The space left over accommodates the required control and I/O blocks (at the top, middle, and bottom of the chip), which can be accessed from the rear of the chip using Through Silicon Vias. The presentation will start with a brief review of the Timepix chips and some applications before describing Timepix4, electrical test results, and measurements with radioactive sources and particle beams.

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Session Classification: Tracking

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