Contribution ID: **39** Type: **talks**

TIMEPIX3: MULTI-CHANNEL HYBRID PIXEL DETECTOR

Wednesday, January 22, 2025 4:30 PM (30 minutes)

Timepix3 is a universal integrated circuit suitable for reading out semiconductor and gas-filled detectors. Timepix3 can be used in a wide range of applications, from X-ray imaging to particle trajectory reconstruction. Depending on the application requirements, the user can choose one of three data acquisition modes available in Timepix3. In data transfer mode, information about the arrival time and charge magnitude simultaneously with the coordinates of the active pixel is sent outside the chip for each recorded signal. The chosen architecture allows continuous data readout at a rate of up to 4*107 hits/s/cm2.
Initial measurements performed with a calibration source demonstrate the functionality of the chip and achievement of the stated specifications with pixel positioning accuracy, time resolution and noise characteristics. Power consumption is below 1 W/cm2, and the bandwidth reaches 20 Mrad/s/cm2 at 40 MHz. All output channels operate at a maximum speed of 640 Mbit/s. Timepix 3 will be used for quality control of RMS4 during 2MeV electron beam irradiation tests.

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Session Classification: Session Contributed talks