



Contribution ID: 130

Type: **Poster presentation**

FITPix Data Preprocessing Pipeline for the Timepix Single Particle Pixel Detector

Tuesday, 5 July 2011 10:08 (1 minute)

The semiconductor pixel detector Timepix contains an array of 256×256 square pixels with pitch of $55 \mu\text{m}$. The single quantum counting detector Timepix can provide also energy or time information in each pixel. This device is a powerful tool for radiation imaging and ionizing particle tracking. The Timepix device can be read-out via serial or parallel interface enabling speed of 100 fps or 3000 fps respectively. The device can be connected to a PC via USB2.0 based interface FITPix which currently supports the serial output of Timepix reaching speed of 90 fps. The FITPix features adjustable clock frequency and hardware triggering which is a useful tool for the synchronized operation of multiple devices. The FITPix interface can handle up to 16 detectors in the daisy chain. The complete system of FITPix interface and Timepix detector is controlled from PC by Pixelman software package. This paper reports on the pipeline structure which has been newly implemented into the new version of FITPix. This version supports also the parallel Timepix read-out. The pipeline architecture brings possibility of data preprocessing directly in hardware. The first pipeline stage converts the raw Timepix data into form of matrix or stream of pixel values. Another stage performs further data processing such as event thresholding and data compression. This way a complex data processing currently performed by Pixelman in PC is significantly reduced. The described architecture together with the parallel read-out increases data throughput reaching higher frame-rate and reducing the dead time. The data compression performed directly in hardware is significant especially for sparse data from particle tracking applications. The frame size is compressed typically by factor of 10-100. This work was carried out within the CERN Medipix Collaboration.

Primary author: Mr KRAUS, Vaclav (IEAP CTU in Prague, University of West Bohemia in Pilsen)

Co-authors: Mr JAKUBEK, Jan (IEAP CTU in Prague); Mr HOLIK, Michael (IEAP CTU in Prague, University of West Bohemia in Pilsen); Mr GEORGIEV, Vjaceslav (University of West Bohemia in Pilsen)

Presenter: Mr KRAUS, Vaclav (IEAP CTU in Prague, University of West Bohemia in Pilsen)

Session Classification: Poster Mini Talks IV

Track Classification: Front-end Electronics and Readout