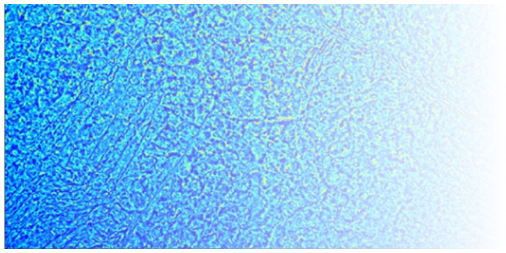

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Characterization and investigation of spectroscopic capabilities of a 3mm CdTe Timepix detector

Friday, 22 March 2019 14:00 (30 minutes)

Cadmium telluride (CdTe) offers excellent absorption efficiency in the energy region above 30 keV and therefore for the detection of high energy levels of radiation originating from common radioactive sources. The absorption efficiency can be further improved by increasing the sensor thickness. However, an expansion of the sensor layer thickness simultaneously increases the effect of charge sharing which results in a spreading of charge information over multiple pixels.
This work introduces a new way to diminish the loss of resolution with the aid of a cluster analysis. The core principle of the code provides an independent identification and separation of clusters collected by pixel matrix of the Timepix. The code is capable to identify and analyze unwanted effects like fluorescence and cluster overlapping, minimizing the loss of information in the process while reaming the full spatial resolution of the detector system. The per-pixel calibration of a thick sensor provides further challenges.
To demonstrate the capabilities of the framework, spectroscopic investigations regarding the common radioactive sources Cobalt60, Cesium137, Europium152 and Americium241 in combination with a 3 mm CdTe Timepix detector are presented. A detailed analysis and well defined parameters for the chosen sources will be shown.

Presenter: Mr FEY, Julian (University of Freiburg)