



Contribution ID: 219

Type: **Oral presentation**

Development of LAMBDA: Large Area Medipix-Based Detector Array

Tuesday, 5 July 2011 11:25 (20 minutes)

The Medipix3 photon counting readout chip has a range of features –small pixel size, high readout rate and inter-pixel communication –which make it attractive for X-ray scattering and imaging at synchrotrons. DESY have produced a prototype large-area detector module that can carry a 6 by 2 array of Medipix3 chips (1536 by 512 pixels), which can be used with a single large silicon sensor (85mm by 28mm) or two “hexa”high-Z sensors. The detector head is designed to be tilable and compatible with low temperatures, and will allow high speed parallel readout of the Medipix3 chips. It consists of a LTCC ceramic board, on which the sensor assembly is mounted, and a secondary board for signal routing and voltage regulators. A prototype DAQ board using USB2 readout has also been produced. Medipix3 readout chips have been mounted on the detector head, and successfully configured and read out by the DAQ board. Currently, a higher-speed readout board using 10GBE links is being developed, and a set of large-area silicon sensors are in production. DESY are also collaborating with other institutes and companies to develop high-Z sensors for use with this module.

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Session Classification: Detector Systems I

Track Classification: Detector Systems