Contribution ID: **70** Type: **ORAL**

XFEL Detector Developments at SACLA

Thursday 8 December 2011 15:20 (20 minutes)

The SPring-8 Angstrom Compact Free Electron Laser (SACLA) facility has observed the X-ray lasing on June 7th, 2011. SACLA is the second laser of its type in operation, following LCLS at the U.S. Department of Energy's SLAC National Accelerator Laboratory. It has produced X-ray laser with 0.08 nm wavelength, which is the world's shortest X-ray laser light. SACLA offers scientists a new tool for studying and understanding the arrangement of atoms moving extremely rapidly in various materials. To meet various the scientific demands at SACLA, we have two X-ray 2D detector projects, namely, multi-port CCD (MPCCD) detector, and multi-via (MVIA) detector by using SOI sensor technology. The MPCCD sensor has 1024 x 512 pixels with 50 um square 2 phase pixels, and 8 output ports at 5.3 MHz to enable 60 frames/sec readout. We have demonstrated the performance of 4.5 Me- peak signal with < 300 e- noise, and over 30 Mrad X-ray radiation hardness. 3 types of detector systems with 1, 2, and 8 sensor arrays have been developed. The latter MVIA detector has multi charge collection nodes inside a pixel to transfer the signal charge disproportionally to the dual gain amplifiers, which enables smaller pixel with larger dynamic range. The goal of the MVIA sensor is to improve the peak signal and noise performances to 7.5 Me- and 100 e-, respectively, while shrinking the pixel size down to 30 um. A large area sensor of this design has been submitted to produce 65.5 mm x 30.0 mm sensor by a CMOS integrated circuit lithography stitching technique.

Author: Prof. HATSUI, Takaki (RIKEN, SPring-8 Center)

Presenter: Prof. HATSUI, Takaki (RIKEN, SPring-8 Center)

Session Classification: Applications in Space, Medical, Biology, Material Sciences

Track Classification: Applications in Space, Medical, Biology, Material Sciences