Contribution ID: **38** Type: **POSTER**

Design of the AGIPD Sensor for the European XFEL

Tuesday 4 September 2012 15:20 (1 hour)

For experiments at the European X-Ray Free-Electron Laser (XFEL), an Adaptive Gain Integrating Pixel Detector (AGIPD) system is under development. The particular requirements for the detector are a high dynamic range of 0, 1 - to more than 1E4
12.4 keV photons per pixel within a XFEL pulse duration of < 100 fs and a radiation tolerance of doses up to 1 GGy for 3 years of operation.

The sensor will have 1024 x 1024 p+-pixels with a pixel size of 200 µm x 200 µm and will be manufactured on 500 µm thick n-type silicon. The design value for the operating voltage is 500 V, however for special applications an operation at above 900 V should be possible.

Experimental data on the dose dependence of the oxide-charge density Nox at the Si-SiO2 interface and the surface-current density Jsurf have been implemented in the SYNOPSYS TCAD simulation program in order to optimize the design of the pixel and guard ring layout. The methodology of the sensor design, the optimization of the most relevant parameters and the layout are discussed. Finally the simulated performance, in particular the breakdown voltage, dark current and inter-pixel capacitance as function of the X-ray dose will be presented.

Primary author: SCHWANDT, Joern (Hamburg University - Institute for Experimental Physics)

Co-authors: FRETWURST, Eckhart (Hamburg University - Institute for Experimental Physics); ZHANG, Jiaguo (Hamburg University - Institute for Experimental Physics); KLANNER, Robert (Hamburg University - Institute for Experimental Physics)

Presenter: POEHLSEN, Thomas (University of Hamburg)

Session Classification: Poster session

Track Classification: Pixel technologies - Hybrid pixels