



Contribution ID: 121

Type: POSTER

Silicon avalanche-photodiode linear array detector with multichannel scaling system for pulsed synchrotron X-ray experiments

Tuesday 2 September 2014 17:37 (1 minute)

We have been developing an X-ray detector system using a 64-pixel silicon avalanche- photodiode (Si-APD) linear array (pixel size: $100\ \mu\text{m} \times 200\ \mu\text{m}$) and pulse counting electronics for multichannel scaling (MCS). The Si-APD linear array consists of 64 pixels $100 \times 200\ \mu\text{m}^2$, with a pixel pitch of $150\ \mu\text{m}$ and a depletion depth of $10\ \mu\text{m}$. The fast response of Si-APD and the MCS system are used for time-resolved X-ray diffraction and nuclear resonant scattering experiments using pulsed synchrotron X-rays. The detector system can resolve successive X-ray pulses at 2 ns intervals and record the pulse counts with a rate of $>10^7$ cps per channel and position of X-rays coming to each pixel of the linear array. The time resolution of 1.4 ns (FWHM) was obtained. The electronics consisting of an ultrafast application-specific integrated circuit, field-programmable gate arrays and a network processor was developed for the linear array system. The detector successfully recorded nuclear resonant small-angle scattering on Fe-57 by scanning the detector position.

Primary author: KISHIMOTO, Shunji (KEK)

Co-authors: Prof. TANAKA, Manobu (KEK); IKENO, Masahiro (High Energy Accelerator Research Organization (KEK)); Mr SAITO, Masatoshi (KEK); Dr HARUKI, Rie (KEK); Mr SHIMAZAKI, Shoichi (KEK); Dr TANIGUCHI, Takashi (KEK); Dr MITSUI, Takaya (JAEA); Dr YODA, Yoshitaka (JASRI)

Presenter: KISHIMOTO, Shunji (KEK)

Session Classification: Poster Session