

One-dimensional detector for diffraction experiments at a synchrotron radiation beam

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One-dimensional detector for time-resolved diffraction studies at a synchrotron radiation beam operating in photon counting mode is under development in the Budker Institute of Nuclear Physics Siberian Branch of Russian Academy of Sciences. The detector will allow to store the dynamics of diffraction process and to sort photons by their energy simultaneously. As a sensitive part we suppose to use microstrip silicon or GaAs sensor with strip pitch of 50 μm coupled to the application specific integrated circuit (ASIC). The prototype of such ASIC has been developed. It contains a charge-sensitive preamplifier, a shaper with shaping time of 500 ns, four comparators that determine four thresholds in order to sort photons by their energy, four scalers and a readout shift register. The equivalent noise charge (ENC) is expected to be about 180 electrons. The prototype ASIC contains 8 such channels with different design options. At present, the front-end board with the ASICs has been assembled and is ready for testing. Development of the detector firmware and software is on the way.

Primary authors: GLUSHAK, Anastasia; SHEKHTMAN, Lev; AULCHENKO, Vladimir; ZHULANOV, Vladimir; TITOV, Vitaly

Presenter: GLUSHAK, Anastasia

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