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The first tests of the 10 MHz position sensitive detector OD-3

V. M. Aulchenko, Yu. S. Velikzhanin, V. M. Titov, S. A. Ponomarev, Yu. V. Usov, M. S. Dubrovin
Budker Institute of Nuclear Physics, M.Lavrentev st.11, Novosibirsk-90, Russia 630090

B. P. Tolochko, Yu. A. Gaponov, and O. V. Evdokov
Institute of Solid State Chemistry, Kutateladze st.18, Novosibirsk-128, Russia 630128

A history of the development of position sensitive (PS) detectors for x-ray experiments in Novosibirsk INP since 1975 is presented. An old OD-2 modification was a relatively simple device based on the proportional chamber with a delay line for the coordinate reconstruction.

The development of a new detector was started two years ago and was stimulated by the users request to improve selected parameters. A completely new one-coordinate detector OD-3 (the main idea of which has been suggested in [1]) was designed to improve the parameters of the OD-2.

OD-3 has the following parameters:
- frequency up to 10 MHz events/detector;
- angular resolution 0.009 degree (near ~100 mkm);
- parallax-free at variable focal length (from 300 mm to 450 mm without any modification and to infinite at cathode plane replacement);
- photoabsorbtion region increased up to 50 mm (and can be increase more);
- enlarged inlet window up to 200 mm x 10 mm.

In July 1995, the OD-3 was tested at the synchrotron radiation beam line 5-b storage ring VEPP-3. Beam test shows:
- it is possible to adjust the chamber focus with necessary precision ~0.5 mm;
- a coordinate resolution ~1.5 bins (r.m.s. in terms of 1/64 from the strip width) without subtraction of the beam size itself was measured in the central part of the chamber;
- this value does not change sufficiently at the side part of the chamber, that can be considered as absence of the parallax.;
- detector can operate at the rate up to ~10 MHz/detector without significant coordinate resolution degradation.

The good results of the test experiments give us optimism for planning unique x-ray diffraction experiments with high time resolution.

[1] Proceedings of the European Workshop on X-Ray Detectors for Synchrotron Radiation Sources, Aussois, France, September 30 - October 4, 1991. S. E. Baru. The One and Two-Coordinate X-Ray Detectors.