s4.m1.o1 **Interference phenomena in x-ray Scattering. Physics, Methodology, Application to phase - sensitive measurements.** M.V. Kovalchuk, S. Zheludeva. *Institute of Crystallography RAS, Leninsky pr. 59, 117333, Moscow, Russia,* jointly with *Institute of Synchrotron Radiation Researches RSC "Kurchatov Institute".*
Keywords: X-ray diffraction, coherent effects, synchrotron radiation.

Application of synchrotron radiation allows to investigate and practically use sophisticated interference phenomena that take place at x-ray diffraction and scattering by condensed matter.

In particular coherent effects connected with generation of x-ray standing waves (inside and above the sample surface) and realization of nontraditional diffraction and scattering geometries (multibeam diffraction, total external reflection, ets.) are under consideration.

Physics of interference phenomena, experimental methods of their investigation and practical application for phase – sensitive studies are broadly discussed [1-4].

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s4.m1.o2 **Focused X-ray Beams: A Renaissance in Laboratory-Based Diffraction Experiments.** B.K. Tanner[1], M. Taylor[2], J. Wall[2], N. Loxley[2], L. Pina[3] & D.K. Bowen[4], *[1]Department of Physics, University of Durham, Durham U.K., [2]Bede Scientific, Durham, U.K., [3]Reflex s.r.o, Prague, Czech Republic, [4]Bede Scientific Inc, Denver, USA.*
Keywords: X-ray generator, X-ray optics.

The brilliance of an x-ray tube is limited by the rate at which heat can be conducted away from the target and only incremental improvements have been seen since the development of the rotating anode generator. Despite the potential gains available through the use of focusing optics, only in the last few years have these been realised in practice. We review the constraints on the use of total reflection and multilayer optics and under which experimental conditions various currently available devices are optimal. We discuss the performance of a variable beam size, microfocus x-ray generator coupled to an ellipsoidal mirror in the area of protein crystallography, high-resolution diffraction and powder diffraction. The results are compared with those from multilayer optics on rotating anode generators and capillary optics. We conclude that there are now focusing devices appropriate to a wide range of x-ray diffraction conditions and that many experiments, once thought to be possible only at synchrotron radiation sources are capable of being performed in the laboratory.