Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

X-ray optical limits of microdiffraction at arc second angular resolution and application to optoelectronic waveguides ALEXANDER KAZIMIROV, Cornell High Energy Synchrotron Source, Cornell University, ANDREI SIRENKO, New Jersey Institute of Technology, DON BILDERBACK, CHESS, Cornell University, ZHONGHOU CAI, Advanced Photon Source ,Argonne National Laboratory, BARRY LAI, APS ,Argonne National Laboratory, RONG HUANG, APS ,Argonne National Laboratory, A. OUGAZZADEN, Universit de Metz, France — Synchrotron microbeam high-angular resolution diffraction setup is introduced based on a phase zone plate generating a microbeam with the size of 0.35 μm (vertical) and 0.24 μm (horizontal) and a perfect Si(004) analyzer crystal providing high angular resolution of about 2 arc sec. The broadening of the "diffraction" spot to 2.5 μm by perfect crystal has been experimentally observed in the diffraction (vertical) plane. This broadening is a consequence of the phase space conservation principle and unavoidable when high angular resolution in microbeam diffraction experiment is required. The use of perfect crystals in a non-dispersive arrangement offers flexibility in trading beam size/flux for resolution by choosing proper crystal or controlling the angular acceptance by changing asymmetry factor. The setup was applied to study strain and thickness variation in selectively grown InGaAlAs-based optoelectronic waveguide arrays with a minimum lateral size of 1.6 μm.

Alexander Kazimirov
CHESS, Cornell University

Date submitted: 30 Nov 2004

Electronic form version 1.4