Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Defects Self-Organization in a Free Standing Buckled GaN Film From 3D Laue X-ray Microdiffraction ROZALIYA BARABASH, GENE ICE, Oak Ridge National Laboratory, WENJUN LIU, Advanced Photon Source — A novel white-beam microdiffraction analysis of defects, strains and tilts in a free standing *m*-plane GaN film grown via hydride vapor phase epitaxy is presented. Depth-resolved measurements reveal dilatational strain gradient along the film normal and formation of large 3D stress fields. It is shown that misfit dislocations self-organize within cell boundaries creating local lattice rotations between the growing cells. Growth cells are highly misoriented relative to each other. Misorientation angle fluctuates in the range of 1.5 - 4.5 degrees. Distribution of lattice rotations in the film is not homogeneous. Regions of large rotations are separated by low rotations regions. The dominating rotation axis is parallel [11-20] direction. There is little overall lattice rotation around the [0001] axis. In contrast the maximal in plane shear stress component is observed along [0001]. Research supported by the Division of Materials Sciences and Engineering, U.S. Department of Energy. Use of the APS supported by Division of Scientific Users Facilities, U.S. D.O. E.

Rozaliya Barabash
Oak Ridge National Laboratory

Date submitted: 22 Nov 2009 Electronic form version 1.4