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Characterization of epitaxially laterally overgrown GaN structures by micrometer-resolved X-ray Rocking Curve Imaging — •Daniel Lübbert[1,2], Tilo Baumbach[1], Petr Mikulik[3], Petra Pernot[1,4], Lukas Helfen[1,4], Stacia Keller[5], and Steven DenBaars[5] — [1]Institut für Synchrotronstrahlung, FZK, D-Karlsruhe — [2]Humboldt-Universität, D-Berlin — [3]Masaryk University, CZ-Brno — [4]ESRF, F-Grenoble — [5]University of California, Santa Barbara, USA

Epitaxial lateral overgrowth (ELO) of GaN works by growing a nucleation layer on a substrate and covering by a mask with laterally periodic openings. Upon subsequent regrowth of GaN, dislocations from the wetting layer can propagate vertically through these mask windows, but not usually into the lateral GaN wings growing on both sides of the windows. The GaN lattice quality in ELO wings is therefore expected to be superior.

We have performed experimental investigations of the *local* lattice quality in ELO structures using a technique of spatially resolved X-ray diffraction named *Rocking Curve Imaging*. It allows to monitor the crystal lattice quality and ELO wing tilt in individual periods of the laterally periodic structure, with spatial resolution down to one micrometer. Results show a highly inhomogeneous lattice tilt distribution across the sample surface. The progressive bending of laterally overgrown areas can be analyzed, showing both concave and convex curvature of ELO wings, depending on growth conditions. Samples grown on different substrates (SiC vs. sapphire) and by different growth sequences (1S- and 2S-ELO) will be compared in view of their crystalline perfection.