Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Nano-scale Strain Mapping using Near-field Microscopy ANTONIO LLOPIS, ARKADII KROKHIN, University of North Texas, SERGIO PEREIRA, CICECO, University of Aveiro, IAN WATSON, University of Strathclyde, ARUP NEOGI, University of North Texas — Advances in nanophotonics are beginning to allow for the creation of nano-scale light emitting devices. Improving the quality of these next-generation emitters requires similarly advanced methods for characterization. These techniques need to be capable of imaging operational prototypes with nanometric resolution. We demonstrate here a new method for mapping strain capable of meeting the demands of next-generation device characterization. This technique makes use of near-field spectroscopy along with theoretical modelling to achieve non-destructive strain mapping with a resolution on the order of 10-100nm. An InGaN ELOG MQW sample is mapped using a SNOM, producing near-field maps of the intensity and Huang-Rhys parameter. Theoretical calculations are then used to obtain the relation between the Huang-Rhys parameter and the biaxial strain ε_{xx}, thereby allowing the production of a near-field map of the biaxial strain in the sample. Finally, to verify the efficacy of the method, we compare the results with those obtained using high-resolution XRD.

Antonio Llopis
University of North Texas

Date submitted: 19 Nov 2010 Electronic form version 1.4