Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Tunable acoustic terahertz generation in InGaN quantum wells effected by metal nanocrystals MEG MAHAT, ANTONIO LIOPIS, Department of Physics, University of North Texas, Denton, TX, 76201,USA, SERGIO PERIERA, CICECO, University of Aveiro, 3810-193 Aveiro, Portugal, IAN WATSON, Institutes of Photonics, SUPA, University of Strathclyde, Glasgow, G4NW, UK, TAE CHOI, Departments of Mechanical Engineering, University of North Texas, Denton, TX, 76203, USA, ARKADII KROKHIN, ARUP NEOGI, Department of Physics, University of North Texas, Denton, TX, 76201,USA — The strained semiconductor multiple quantum wells have the capability to generate acoustic terahertz emission via coherent acoustic phonon oscillations. The frequency of the THz emission is usually limited by the periodicity of the quantum wells or superlattice structures. We propose a novel technique to modify the frequency and amplitude of THz oscillations by the inclusion of the metal nanocrystals (NCs) within InGaN/GaN multiple quantum wells via the self-assembled inverted hexagonal pits. Time resolved differential transmission measurements demonstrate a four-five folds decrease in the THz frequency under band edge excitation conditions. A theoretical model predicts a strong dependence of the amplitude and period of the oscillations on the radius of the metal NCs.

Meg Mahat
Department of Physics, University of North Texas,
Denton, TX, 76201,USA

Date submitted: 23 Nov 2010 Electronic form version 1.4