Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Two dimensionally patterned GaN_xAs_{1-x} Quantum Dots Fabricated using Ion Implantation and Pulsed Laser Melting characterized by Ballistic Electron Emission Microscopy. TAESEOK KIM, MICHAEL J. AZIZ, VENKATESH NARAYANAMURTI, Division of Engineering and Applied Sciences, Harvard University — We will present Ballistic Electron Emission Microscopy (BEEM) measurements on 2D patterned GaN_xAs_{1-x} nanostructures fabricated in a GaAs matrix using nitrogen ion implantation followed by pulsed laser melting and rapid thermal annealing (RTA). As a three terminal scanning tunneling microscopy technique, BEEM can image both the surface topography and the local hot electron transport. Using ion implantation through a lithographically patterned mask and varying subsequent processing conditions, we have made locally confined GaNxAs1-x dots with different activated nitrogen concentrations. By analyzing BEEM images of the quantum dots, we study giant bandgap bowing effects on the Schottky barrier height. We will also discuss the effects of different implanted nitrogen concentrations, laser fluences and RTA conditions on the conduction band structures of these quantum dots.

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Date submitted: 17 Nov 2006 Electronic form version 1.4