Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Manganese Atom Ordered Monolayer on Wurtzite Gallium Nitride ABHIJIT CHINCHORE, KANGKANG WANG, Nanoscale and Quantum Phenomena Institute, Department of Physics and Astronomy, Ohio University, Athens, OH 45701, WENZHI LIN, JEONGIHM PAK, YINGHAO LIU, ARTHUR SMITH — While transition-metal-doped gallium nitride (GaN) thin films have been explored as potential dilute magnetic semiconductor bulk layers, the structural and magnetic effects of various transition metal adatoms on GaN surfaces are not even well understood. In this work, we investigate the sub-monolayer deposition of manganese (Mn) onto the N-polar wurtzite GaN (000-1) 1×1 surface. The growth is monitored in-situ using reflection high energy electron diffraction (RHEED). A fresh GaN(000-1) 1×1 surface is prepared by rf nitrogen plasma-assisted MBE followed by annealing to remove excess gallium adatoms. The atomically flat GaN surface, held at 200^o C, is then exposed to submonolayer doses of Mn. The deposition rate is maintained at 0.007 ML per second, and a 3× pattern develops along [10-10]; whereas, only 1× is seen along [11-20]. Analysis of the RHEED pattern and subsequent modeling indicates a $\sqrt{3}$ ×$\sqrt{3}$ R 30^o structure consisting of 2/3 ML Mn atoms in a row-like arrangement having spacing $\sqrt{3}$a/2 along rows and 3a/2 between rows. Scanning tunneling microscopy/spectroscopy studies are currently underway to explore this surface further. This work is supported by DOE (Grant No.DE-FG02-06ER46317) and NSF (Grant No. 0730257).

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Date submitted: 11 Dec 2008 Electronic form version 1.4