

Abstract Submitted  
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**Heteroepitaxial growth and surface structure of  $L1_0$ -MnGa(111) ultra-thin films on GaN(0001)** ANDRADA-OANA MANDRU, REYES GARCIA DIAZ, KANGKANG WANG, KEVIN COOPER, MUHAMMAD HAIDER, DAVID INGRAM, NOBORU TAKEUCHI, ARTHUR R. SMITH, Nanoscale and Quantum Phenomena Institute, Department of Physics and Astronomy, Ohio University, Athens, OH 45701, USA — Ferromagnetic MnGa(111) deposited on semiconducting GaN(0001) is a promising system due to the interest in developing nitride spintronic systems and the observed ideal lattice matching and sharp growth interface. [1] The experiments are carried out in a molecular beam epitaxy (MBE) system interconnected to an ultra-high vacuum (UHV) analysis chamber containing room-temperature scanning tunneling microscopy (STM). Ultra-thin MnGa films (23 nm) are grown heteroepitaxially on GaN(0001) substrates, while maintaining the Mn:Ga flux ratio at about 1.09. After growth, the sample is transferred in-situ to the analysis chamber for STM and Auger electron spectroscopy (AES) studies. STM imaging reveals the presence of smooth terraces and angular step edges and also the existence of both  $1\times 2$  and  $2\times 2$  surface structures. Additional Rutherford backscattering spectroscopy (RBS) measurements help clarify the important relationship between surface and bulk. Theoretical work has also been carried out and the resulting structural models and simulated STM images for both surface structures are compared to the STM images. [1] E. Lu, D. C. Ingram, A. R. Smith, J. W. Knepper and F. Y. Yang, Phys. Rev. Lett. 97, 146101 (2006)

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