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Magnetic properties of single and bilayer MnGa on GaN(0001) investigated by spin-polarized STM Y. QI, G. SUN, M. WEINERT, L. LI, University of Wisconsin, Milwaukee — We investigated the magnetic properties of ultrathin GaMn layers grown on GaN(0001) by spin-polarized scanning tunneling microscopy (SP-STM) using an Fe coated W tip. The GaN films are grown by plasma-assisted MBE on 6H-SiC(0001), and exhibit a metallic pseudo-1x1 surface structure, consisting of 2.3 ML Ga on top of the Ga-terminated GaN. At room temperature, Mn deposition on this surface resulted in the formation of GaMn islands, with the second layer islands begin to nucleate before the first layer is completed. With a Fe coated W tip, contrast between odd and even layers is observed, indicating layered antiferromagnetic magnetization of the GaMn layers. When Mn is deposited on the pseudo (1x1) at 200 C, a GaMn (3x3) structure is observed. First principles calculations show that Mn substitution of Ga leads to virtual bound states with bandwidth of 1.5 eV, indicating significant Mn-Ga interactions. As a result, top layer Ga atoms form covalent-like bonds. The Mn and the librated Ga atoms from the "1x1" form the (3x3) structure, with the adatom on the T_4 site.

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