

Abstract Submitted
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Scanning Tunneling Microscopy Studies of Mn acceptor levels in $\text{Ga}_{1-x}\text{Mn}_x\text{As}$ ¹ PEDRAM ROUSHAN, ANTHONY RICHARDELLA, Princeton University, SHAWN MACK, DAVID AWSCHALOM, UCSB, ALI YAZDANI, Princeton University — We have used a low temperature scanning tunneling microscope (STM) to perform studies of GaMnAs/GaAs heterostructures with various Mn dopant concentrations. The STM topography of the GaMnAs showed a variety of electronic structure modulations on the order of a few nm indicating the presence of a high level of disorder and compensation. These measurements show no indication of Mn clustering as the Mn concentration is increased. On both sides of the Metal-Insulator Transition (MIT), the differential conductance (dI/dV) measurements on Mn dopants showed a broad acceptor level above 100meV from the valence band edge. Furthermore, we have mapped in energy the spatial variations of these deep acceptor levels, and their distribution will be presented for all Mn concentrations studied. The effect of disorder and coulomb correlations in modifying the local density of states close to Fermi level will be discussed for insulating as well as metallic samples.

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