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**Probing the nature of electronic state near the Fermi level in $Ga_{1-x}Mn_xAs$ with STM**[1] ANTHONY RICHARDELLA, Princeton University / UIUC, PEDRAM ROUSHAN, Princeton University, SHAWN MACK, DAVID AWSCHALOM, UCSB, ALI YAZDANI, Princeton University — We have studied the electronic states near the Fermi energy in GaMnAs/GaAs heterostructures as a function of doping across the metal-insulator transition. These measurements allow us to determine the position of $E_F$ with respect to the valance band edge and in gap states related to the Mn induced acceptor states. As the doping level increases we observe an increase in the density of states at the Fermi energy and map their spatial dependence. Statistical analysis of these measurements can be used to find a characteristic length scale associated with growth of bulk metallic behavior for these samples. In addition, our measurements indicated a suppression of the density of states near $E_F$ at all doping levels, consistent with that expected for correlation effects in doped semiconductors near the metal-insulator transition. We will discuss these findings and their relation with various theoretical models for electronic states in GaMnAs that are expected to mediate the magnetic interaction in this compound.

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