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Mechanism for electric field driven single spin manipulation of a Mn dopant in GaAs JIAN-MING TANG, University of Iowa, JEREMY LEVY, University of Pittsburgh, MICHAEL E. FLATTÉ, University of Iowa — We show that the spin orientation of a $J = 1$ (Mn + hole) complex in GaAs can be manipulated using only electrical control fields. The spin degeneracy of the compound spin can be split by a dc electric field due to inversion symmetry breaking. The resonances, corresponding to transitions between the split levels, can be driven by an ac electric field. As the bound hole has an anisotropic shape that depends on the compound spin orientation, we propose that the resonance of a single spin can be detected in the tunneling current with scanning tunneling microscopy. The visibility of the resonance is high, as the total (not spin-resolved) local density of states can change as much as 90% for sites near the Mn dopant as the compound spin orientation is changed. This work is supported by ARO MURI DAAD19-01-1-0541 and DARPA QuIST DAAD-19-01-1-0650.

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