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Temperature Dependence of the Contact Resistance of Copper and Silver to GaMnAs KHALID EID, NOAH OPONDO, BHIM PAUDEL, CALFORD OTIENO, GRANT RILEY, XINYU LIU, JACEK FURDYNA, PHYSICS DEPARTMENT, MIAMI UNIVERSITY TEAM, DEPARTMENT OF PHYSICS, UNIVERSITY OF NOTRE DAME TEAM — We will present our recent measurements and analysis of the specific contact resistance of silver and copper to the heavily p-doped ferromagnetic semiconductor GaMnAs. We employ the circular transmission line method (TLM) and four-point measurements to obtain both the specific contact resistance and the current transfer length as functions of sample temperature down to 20K. Our results clearly suggest that the dominant current transfer method at the ferromagnetic semiconductor/metal interface is field emission (i.e. tunneling), since there is very little variation of the contact resistance with temperature. Yet, a slight decrease of the contact resistance with lowering sample temperature below the GaMnAs Curie temperature indicates strong carrier recombination at the interface due to surface states. We found the specific contact resistance to be as low as $1x10^{-7}\Omega cm^2$. Our results provide insight on the current flow mechanisms and might guide experiments on spin injection from GaMnAs into non-magnetic metals.

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