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Reconfigurable spin logic gate in Gallium Arsenide[1] C. AWO-AFFOUDA, O.M.J. VAN 'T ERVE, M. HOLUB, C.H. LI, A.T. HANBICKI, G. KIOSEOGLOU, B.T. JONKER, Naval Research Laboratory, Washington, DC 20375 — Electrical injection and detection of pure spin currents has recently been shown in semiconductors. Here we concentrate on the realization of spin-based logic circuits in semiconductors. We report on the electrical injection and detection of spin polarized currents using reconfigurable magnetic contacts. Fe/GaAs Schottky contacts are used to create and analyze the spin current in a GaAs transport channel. Non-local detection techniques show that the circuit output voltage can be modulated using current carrying wires that independently switch the magnetization of the contacts. We use this effect to generate a logic function based on pure spin transport in semiconductors. The realization of this integrated spin-based structure may facilitate the development of pure spin-based logic gates.

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