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Magnetotransport of hybrid nanoparticle-nanowire systems[1]
DONGKYUN KO, COLE ROBINETTE, XIANWEI ZHAO, FENGYUAN YANG, EZEKIEL JOHNSTON-HALPERIN, The Ohio State University — Semiconductor nanowires decorated with metal nanoparticles have a number of interesting electronic and photonic properties. For example, top-gated field effect transistors based on these hybrid systems have shown charge storage when operated in a floating-gate architecture. In addition, recent measurements have demonstrated that spin relaxation and phase coherence lengths can be extracted from magnetoconductance patterns in the gating response of bare nanowires. Together, these results suggest the possibility of *in situ* tuning of the spin relaxation length in hybrid systems via modulation of the floating-gate potential. Initial efforts along these lines will be presented, including gating response and low temperature magnetotransport in 50 nm diameter InP nanowires decorated with Au nanoparticles from 20 – 250 nm in diameter. The potential utility of these systems as testbeds for the exploration of spin scattering and transport will be discussed.

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