

Abstract Submitted
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Large magnetoresistance on spin injection in InSb/CoFe junctions MARTIN RUDOLPH, Y.J. KIM, J.J. HEREMANS, Virginia Tech — During electrical spin injection from micron-sized ferromagnetic CoFe structures into the strongly spin-orbit coupled semiconductor InSb, we observe an unanticipated magnetoresistance at low temperatures. For temperatures below 3.5 K, the interface resistance falls abruptly, by up to 25%, at a critical magnetic field. The functional dependence on magnetic field of the magnetoresistance and the temperature and angular dependence of its amplitude and width are not consistent with previously observed magnetoresistive semiconductor/ferromagnet junction phenomena. A differential conductance map of the density of states shows a symmetric minimum at zero current bias corresponding to the magnetoresistance maximum. The experimental observations appear consistent with formation of a quasiparticle gap of width approximately 0.5 meV during a phase transition in spin polarized InSb for temperatures below 3.5 K and magnetic fields below a critical field (DOE DE-FG02-08ER46532).

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