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Influence of Magnetic Molecules on Electron Spin Scattering in InAs as Seen in Its Low Temperature Magnetoresistance JOSEPH GILPIN, University of Dallas, VICTORIA SOGHOMONIAN, JEAN HEREMANS, RAYMOND KALLAHER, Virginia Tech — Quantum interference between different scattering trajectories of electrons in solid-state systems leads to corrections to the classically predicted electrical resistivity. InAs films were studied, focusing on the influence of a monolayer of the magnetic molecule, Mn12, on the spin scattering of the electrons in the InAs accumulation layer. The weak localization and anti localization phenomena were examined via comparison of the magneto-resistance, as predicted by Bergman.[1] The localization effects were measured at temperatures of 0.4 K. Through the study of the characteristic localization effects it is possible to determine the existence and effect of the quantum scatterings. In initial experiments clear anti-localization is observed, but the trends have not yet yielded systematic and consistent answers correlating the effect of the Mn12 monolayer to the spin scattering in the InAs layer. Future refinement of our system of Mn12 application better suited to the delicate InAs surface is expected to produce clearer evidence of the localization phenomena, and subsequently insight into scattering effects.

[1]Bergmann, G. (1984). Weak Localization In Thin Films: a time-of-flight experiment with conduction electrons. *Physics Reports (Review Section of Physics Letters)* (107), 1-58.

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