Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Conductivity for a Spin-Split 2D Electron System GODFREY GUMBS, Hunter College of CUNY — Recent research on spintronic systems has examined a wide variety of their transport and optical properties from both a theoretical and experimental perspective. By including spin-orbit interaction (SOI) in a model Hamiltonian, we calculate the low-frequency local conductivity, starting with Kubo's formula. For long mean-free paths, we obtain a closed-form analytical result which is a generalization of the Drude conductivity. By adding vertex corrections using maximally crossed Feynman diagrams to our result, we also obtain, to lowest order in the scattering parameter, the non-local conductivity is given in terms of function which shows that there is an "interference" effect due to the SOI. This means that the electrons do not diffuse through the sample when the SOI is neglected, as it demonstrated several years ago.

Godfrey Gumbs
Hunter College of CUNY

Date submitted: 23 Nov 2005 Electronic form version 1.4