Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

**Interplay of the Rashba and Dresselhaus spin-orbit coupling in the optical spin susceptibility of 2D electron systems** CATALINA LOPEZ-BASTIDAS, JESUS A. MAYTORENA, FRANCISCO MIRELES, CCMC-UNAM — Electrical manipulation of electron and hole spins without use of ferromagnetic materials and/or external magnetic fields is currently one of the important goals in the field of spintronics. The presence of a sizeable spin-orbit interaction (SOI) in low-dimensional semiconductor structures and its modulation possibility make it a good mechanism for the access and manipulation of the carriers spin states. The spin susceptibility gives the average spin polarization induced via electric- or magnetic- dipole interactions and can be used to obtain a magnetic susceptibility or the electric-field-induced spin orientation factor. Charge or spin Hall conductivities can be related to this susceptibility making it an interesting quantity in the study of spin dynamics of a 2D electron gas (2DEG). In this work we present calculations of the frequency-dependent spin susceptibility tensor of a 2DEG with competing Rashba and Dresselhaus SOI. We show that the interplay between both types of spin-orbit coupling gives rise to a rich anisotropic spectral behavior of the spin density response function. Strong resonances are thus developed in the susceptibility as a consequence of the angular anisotropy of the energy spin-splitting. This modulable optical response may be useful to experimentally probe spin accumulation and spin density currents in such systems.

Catalina Lopez-Bastidas
CCMC-UNAM

Date submitted: 26 Nov 2006 Electronic form version 1.4