

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Numerical studies of non-Drude ac-conductivity and infrared magneto-optics in $(\text{Ga}_{1-x}\text{Mn}_x\text{As})$ HUAWEI GAO, JAIRO SINOVA, Texas A&M University — Optical absorption experiments on (III,Mn)V diluted magnetic semiconductors (DMS's) show that the ac-conductivity has non-Drude behavior at low frequency. The numerical simulation of this problem has been done previously using the effective Hamiltonian model with various treatments of the disorder effects. We are re-examining the previous works with a similar numerical method to establish the nature of the transitions in the low to the high doped regime. We use the effective Hamiltonian k.p model to describe the holes introduced by Mn impurities and treat the Mn impurities exactly using the envelope function approximation. With this technique we are able in principle to analyze spectrally the origin of the mid-infrared absorption peak, its trends, and the nature of the states near the Fermi energy as well as the excitation states. We will also report on numerical results of the magneto-optical response with this more accurate treatment of the effect of disorder.

Huawei Gao
Texas A&M University

Date submitted: 17 Nov 2011

Electronic form version 1.4