

Abstract Submitted  
for the MAR15 Meeting of  
The American Physical Society

**Magneto-transport characteristics of a 2D electron system driven to negative magneto-conductivity by microwave photoexcitation<sup>1</sup>**

RAMESH MANI, Georgia State University, A. KRIISA, Emory University — Negative diagonal magneto-conductivity/resistivity is a spectacular- and thought provoking- property of driven, far-from-equilibrium, low dimensional electronic systems. The physical response of this exotic electronic state is not yet fully understood since it is rarely encountered in experiment. The microwave-radiation-induced zero-resistance state in the high mobility GaAs/AlGaAs 2D electron system is believed to be an example where negative magneto-conductivity/resistivity is responsible for the observed phenomena. Here, we examine the magneto-transport characteristics of this negative conductivity/resistivity state in the microwave photo-excited two-dimensional electron system (2DES) through a numerical solution of the associated boundary value problem. The results suggest, surprisingly, that a bare negative diagonal conductivity/resistivity state in the 2DES under photo-excitation should yield a positive diagonal resistance with a concomitant sign reversal in the Hall voltage.

<sup>1</sup>Transport measurements are supported by the DOE, Office of Basic Energy Sciences, Material Sciences and Engineering Division under DE-SC0001762. Additional support by the ARO under W911NF-07-01-015

Ramesh Mani  
Georgia State University

Date submitted: 14 Nov 2014

Electronic form version 1.4