



Department of Physics, Astronomy, and Materials Science
Colloquium, Spring 2009

Nanoscale Electronic Transport in Semiconductors by Femtosecond Laser Techniques

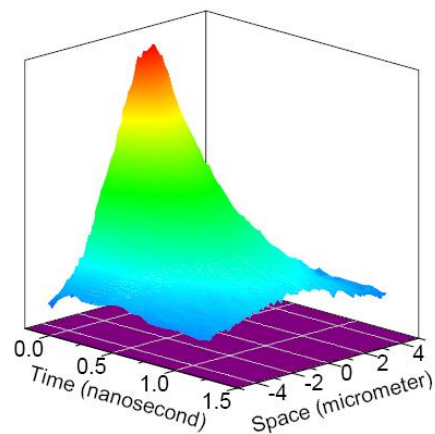
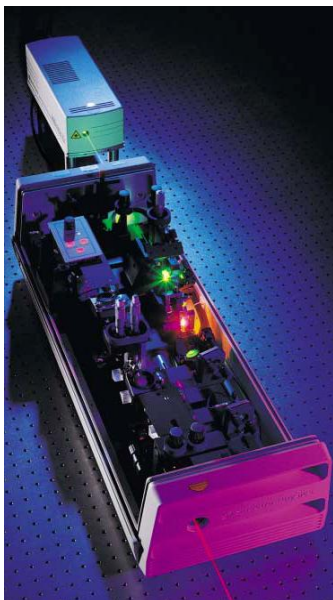
Dr. Hui Zhao

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The University of Kansas, Lawrence, KS 66045

4:00 to 5:00 pm, Thursday, April 30, 2009

Kemper Hall Room 100

Electronic transport on nanometer dimensions is of fundamental importance in semiconductor nano-electronics. In this talk, real-space observations of ballistic spin and charge transport on nanoscales in semiconductors by femtosecond laser techniques will be discussed. Some basic ideas on optical injection of ballistic spin and charge currents will be introduced. This will be followed by an introduction on optical pump-probe techniques we developed, and how to overcome the diffraction limit and achieve sub-nanometer spatial resolution. Using these techniques, the ultrafast evolution of ballistic pure spin currents, pure charge currents and spin-polarized charge currents are directly observed in real space. The application of these techniques to study spin Hall effect will also be discussed.



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