

EE 298-12
Solid State Technology and Devices Seminar

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1-2pm
Hogan Room - 521 Cory Hall

Controlling magnets without a magnetic field

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Abstract

Traditionally magnets have been used in storage class memory applications where a magnetic field is used to write into a magnetic media and store bits. It is only over the last decade that control of magnetization without using a magnetic field has been demonstrated. The basic physics is predicated upon a quantum mechanical principle known as spin torque transfer where spin polarized electrons flow through a magnet and exert a torque on it by transferring angular momentum. If the torque is sufficiently strong, the magnet orients itself to the direction of the polarized spins. Not having to apply an external magnetic field makes it significantly easier to integrate such memory on-chip and currently there is a lot of effort in both academia and industry to potentially use spin transfer torque devices for non-volatile cache memories. In this talk, I shall review some of the fundamentals of spin transfer torque phenomena including the current state of the art. I shall also discuss some of our recent efforts on alternative ways to control magnetization without a magnetic field.