

Massachusetts Institute of Technology
Department of Physics

Condensed Matter Theory Seminar

"Strongly anisotropic ballistic magnetoresistance in compact three-dimensional semiconducting nanoarchitectures"

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Abstract: After an introduction to the electronic properties of semiconducting materials in curved geometries, I will discuss the recent theoretical finding of a strongly anisotropic ballistic magnetoresistance in non-magnetic thin films rolled-up into compact quasi-one-dimensional nanoarchitectures. This phenomenon originates from the curved open geometry of rolled-up nanotubes and thus does neither require the presence of magnetism nor the presence of a spin-orbit interaction. The experimental significance is illustrated by a sizable anisotropy that scales with the inverse of the winding number, and persists up to a critical temperature that can be strongly enhanced by increasing the strength of the external magnetic field or the characteristic radius of curvature, up to room temperature.

References:

- [1] C. Ortix, J. van den Brink PRB 81, 165419 (2010), PRB 83, 113406 (2011) ; C. Ortix, S. Kiravittaya, O.G. Schmidt, J. van den Brink PRB 84, 045438 (2011)
[2] C.-H. Chang, J. van den Brink, C. Ortix PRL 113, 227205 (2014).

12:00noon
Tuesday, March 10, 2015
Duboc Seminar Room (4-331)