Chez Pierre

Presents ...

Monday, November 3, 2014
12:00pm
MIT Room 4-349

Chez Pierre Seminar

Joe Orenstein

University of California - Berkeley

"Polarization rotation in cuprates: half truths and factors of one-half."

Although I am an experimentalist, I expose my latent theorist in this talk. The subject is the polar Kerr effect (rotation of the plane of polarization upon normal incidence reflection) as performed by the Stanford group under the supervision Aharon Kapitulnik. I will first explain why the Kerr effect has a unique status in the phenomenology of the high-T_c cuprate superconductors. Then I describe efforts to explain the observed polarization rotation in terms of either time-reversal or chiral symmetry breaking. Although in the end the Kerr effect in cuprates remains something of a mystery, an unintended consequence of the effort is the demonstration that polarization rotation in a chiral metal is a manifestation of the Berry phase of band electrons. In the end, this line of research leads to the interesting speculation that the correct semiclassical equations of motion for electrons moving through a textured Berry phase are not yet known.