

University of California, Davis  
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Condensed Matter



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“In-plane optical conductivity and electronic kinetic energy in cuprate Superconductors”

New quantitative approaches relying on infrared and visible measurements in cuprates have been initiated for the last few years, such as tracking the optical spectral weight with temperature and carrier concentration. This is of special interest because i) spectral weight shifts with temperature are the hallmark of the onset of gaps opening at the Fermi surface and ii) in a tight binding model which can apply to cuprates, the spectral weight - associated with the conduction band - measures the electronic kinetic energy.

I will illustrate these two points by presenting some of our most significant results in both electron-doped and hole doped-cuprates. I will discuss the unconventional spectral weight changes upon varying the carrier concentration and the temperature. I will argue that Mott physics is relevant in cuprate superconductivity in the low carrier concentration regime, and show the crossover towards a BCS-like behaviour at large carrier concentration. As an experimentalist, I will only mention a few models currently under investigation, in order to describe these experimental data.

**Thursday, May 18, 2006**  
4:10pm, Room 416 Phy/Geo