Prof. Dan Dessau

University of Colorado, Boulder

Friday, November 11, 11:00 am. Osborne A204

Resistance is Futile:
Novel superconductivity, Correlated Electrons, and New Quantum Devices.

Superconductivity, or a true zero-resistance state, is known to originate from the creation of Cooper pairs of electrons that can condense into a phase-coherent macroscopic quantum state. The physics behind the creation of this state as well as the new physics this state can enable are beautiful, exotic, and deeply rooted in the magic of quantum mechanics.

I will discuss recent experiments utilizing Einstein's photoelectric effect (greatly improved since his days) that allow us to directly probe the nature of the Cooper pairs and the electronic interactions that give rise to these pairs in some novel superconductors. I will also discuss electronic correlations or interactions, how they are critical for superconductivity as well as for new types of quantum devices.

Short Bio

Dan Dessau is a professor in the Department of Physics, University of Colorado Boulder and is involved with multiple research centers on the Boulder campus, including JILA, RASEI, MSE, and CEQM (too many acronyms that are not worth spelling out!). He is a Fellow of the American Physical Society, and Past-Chair of the Division of Materials Physics, American Physical Society. He received his PhD in Applied Physics from Stanford University in 1993, working with Professors W.E. Spicer and Zhi Xun Shen. He has been at the forefront of electronic spectroscopies of correlated electron systems for many years, especially for the development of high-resolution angle-resolved photoemission spectroscopy (ARPES) and laser-ARPES, for studies of the pairing symmetry and pseudogaps in cuprates, on the nature of colossal magnetoresistance in manganites, and studies of other novel materials. His publications describing this work have been cited over 12,000 times.