

University of California, Davis
Physics Department
Condensed Matter



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“The Metal Insulator Quantum Phase Transition”

I will present a survey of recent experimental results focusing on the Metal Insulator Transition (MIT) in doped semiconductors, comparing results from heavily doped amorphous metal semiconductor alloys to uncompensated doped crystalline silicon. The talk will consist of three parts discussing separately the quantum critical region, the insulating and the metallic sides of the MIT.

THz optical conductivity results in the insulating regime show distinct features resulting from electronic correlations verifying predictions by Efros and Shklovskii. Quantum critical scaling results, as a function of both concentration tuning and magnetic field tuning, will be presented for a magnetically doped amorphous metal-semiconductor alloy, a-GdSi.

Temperature frequency scaling in the magnetically doped alloy will be compared to a non-magnetic analogous system. Finally, on the metallic side of the MIT, a surprisingly universal behavior of the residual conductivity and the temperature dependent pre-factor amplitudes for the

DC transport for a wide range of amorphous metal semiconductor alloys as well as for crystalline Si:P will be presented and discussed.

Thursday, June 1, 2006

4:10pm, Room 416 PHY/GEO