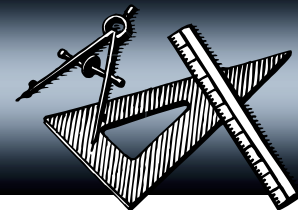




# CU Physics Department Colloquium

Monday, October 8, 2007 4:15 PM 428 Pupin Hall



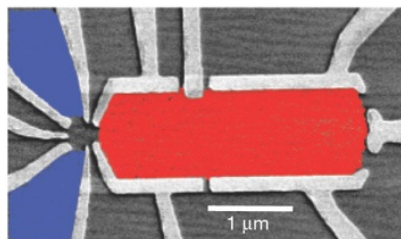
**Professor David Goldhaber-Gordon, Stanford University**

## **Designer Hamiltonians in the Laboratory:**

### **Observation of Many Body Physics in a Semiconductor Nanostructure**

Physicists and material scientists have long designed materials with remarkable and varied electronic behaviors, from charge-density waves to high-temperature superconductivity. Much of the most intriguing phenomena involves highly correlated electron physics - the motion of one electron dramatically effects the motion of surrounding electrons. A classic example of this is the two- channel Kondo system, where a local magnetic moment is screened by two independent conduction reservoirs.

Following a proposal by Oreg and Goldhaber-Gordon, I will discuss an experimental realization of the two- channel Kondo Hamiltonian in a semiconductor nanostructure. With a geometry of two coupled quantum dots in a 2D electron system, we are able to tune in situ the parameters of the two channel Kondo model. Using electrostatic gates, we tune continuously between two distinct Fermi liquid regimes, which are characterized by different values of conductance through the nanostructure. We investigate the properties of this quantum phase transition and the associated two-channel Kondo quantum critical point.



**Hosted by Phillip Kim**

