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The Two-channel Kondo Effect in a Semiconductor Nanostructure ILEANA RAU, Stanford University, RON POTOK, Harvard University, DAVID GOLDHABER-GORDON, Stanford University — Quantum dots have proven to be excellent systems for studying the single-channel Kondo effect, the many-body ground state resulting from the interaction between a spin $1/2$ quantum dot and a reservoir of conduction electrons. The two-channel Kondo effect is achieved by coupling the dot with equal strength to two independent reservoirs. In this case the reservoirs compete to independently form a Kondo state with the dot, resulting in overscreening of the excess spin. In a new semiconductor double quantum dot geometry, proposed by Y. Oreg and D. Goldhaber-Gordon (1), we observe spin two-channel Kondo physics. Low temperature transport measurements through the smaller of the two dots reveals that the double dot – leads system undergoes a quantum phase transition from one competing single-channel Kondo state to another. By tuning between these two Fermi liquid regimes, we observe the non-Fermi liquid signature of the two-channel Kondo state. I will explore recent experimental progress and open questions. (1) Y. Oreg, D. Goldhaber-Gordon, PRL **90** 136602 (2003)

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