Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Conductance signatures of quantum phase transitions in asymmetric double quantum dots

W. BRIAN LANE, Jacksonville U. and U. of Florida, KEVIN INGERSENT, U. of Florida, LUIS DIAS DA SILVA, Oak Ridge Natl. Lab. and U. of Tennessee, NANCY SANDLER, SERGIO ULLOA, Ohio U. — Double quantum dots (DQDs) are currently of great theoretical and experimental interest. A DQD device in which dot 1 is in the Kondo regime and dot 2 acts as a noninteracting resonant level can be tuned to access a pair of quantum phase transitions separating Kondo-screened and local-moment phases [1]. This talk focuses on the effects of introducing a nonzero Coulomb interaction $U_2$ on the second dot. For small $U_2$, the system continues to exhibit two quantum phase transitions, although their nature is markedly different than for $U_2 = 0$. However, stronger interactions $U_2 > U_{2,c}$ suppress the local-moment phase and destroy the quantum phase transitions. We use numerical renormalization-group techniques to identify signatures of these behaviors in the linear conductance of the DQD device. [1] L. G. G. V. Dias da Silva, N. P. Sandler, K. Ingersent, and S. E. Ulloa, Phys. Rev. Lett. 97, 096603 (2006).

1Supported by NSF Grants DMR-0312939 and DMR-0710540 (Florida), DMR-0304314 and DMR-0710581 (Ohio).

W. Brian Lane
Jacksonville U. and U. of Florida

Date submitted: 03 Dec 2007