Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Jahn-Teller / Kondo Interplay in a Three-Terminal Quantum Dot

R.C. TOONEN, University of Wisconsin (UW), H. QIN, UW, A.K. HUETTEL, Ludwig-Maximilians-Universitaet, S. GOSWAMI, UW, D.W. VAN DER WEIDE, UW, K. EBERL, Max-Planck-Institut fuer Festkoerperforschung, R.H. BLICK, UW

— The Jahn-Teller effect is the spontaneous geometric distortion of a nonlinear molecular entity. The Kondo effect, an expression of asymptotic freedom, arises from the hybridization between localized states of a magnetic impurity and the itinerant states of its environment. The interplay of these two phenomena has attracted the attention of theorists studying the growth and interactions of heavy-fermion systems. Because of the technical difficulties associated with probing isolated impurities in bulk materials, this composite effect has remained experimentally unexplored. We have investigated co-tunneling transport phenomena in a three-terminal quantum dot with triangular symmetry. Our measurements of anomalous spectral signatures reveal interplay between the Jahn-Teller and Kondo effects. This discovery suggests a means of controlling the correlation of spatially separated pairs of entangled electrons (EPR pairs)—a necessary condition for the physical realization of a quantum computer (DiVincenzo's 7th requirement).

Ryan Toonen
University of Wisconsin

Date submitted: 30 Nov 2005 Electronic form version 1.4