Abstract Submitted
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Connection between Local moment and Underscreened Kondo effect in parallel double quantum dots[1] SERGIO ULLOA, NANCY SANDLER, Ohio U, ARTURO WONG, KEVIN INGERSENT, U of Florida, WILLIAM LANE, Jacksonville U, LUIS DIAS, U of Sao Paulo — Double quantum dots connected in parallel to a single channel, have been studied theoretically in two disparate limits: (I) Systems in which each dot has strong Coulomb interactions, exhibiting an underscreened spin-1 Kondo effect [1]; (II) An interacting dot 1 and a non-interacting dot 2, showing a quantum phase transition between Kondo phase and non-Kondo local-moment [2]. In this work, we use the numerical renormalization group approach to study a strongly interacting "quantum dot 1" and a weakly interacting "dot 2" connected in parallel to metallic leads. Gate voltages can drive the system between Kondo-quenched and free-moment phases separated by Kosterlitz-Thouless quantum phase transitions. As interactions in dot 2 become stronger relative to the dot-lead coupling, the free moment evolves from an isolated spin-1/2 in dot 1 to a many-body doublet arising from an underscreened Kondo effect. These limits, which feature very different entanglements between dot and lead electrons, can be distinguished by conductance measurements at finite temperatures.

[1] D. E. Logan, C. J. Wright, and M. R. Galpin, PRB 80, 125117 (2009).
[2] L. G. G. V. Dias da Silva et al., PRL 97, 096603 (2006).

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