Abstract Submitted
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Transport through a quantum dot with excitonic dot-lead coupling[1] FLORIAN ELSTE, DAVID R. REICHMAN, ANDREW J. MILLIS, Columbia University — We study the effect of a Coulombic dot-lead interaction on transport through a quantum dot hybridized to two Luttinger-liquid leads.[2] A bosonization approach is applied to treat the interaction between charge fluctuations on the dot and the dynamically generated image charge in the leads.[3] The nonequilibrium distribution function of the dot and the tunneling current are computed within a master-equation approach. Particular attention is paid to two situations: (i) a quantum dot placed between two leads such that it cuts the Luttinger liquid into two semi-infinite quantum wires; (ii) a quantum dot side-hybridized to two parallel infinite quantum wires. The presence of the excitonic dot-lead coupling is found to enhance transport in the vicinity of the Coulomb-blockade threshold. This behavior is in contrast to the usual power-law suppression of electronic tunneling which is found if this interaction is ignored.

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[2]F. Elste, D. R. Reichman, and A. J. Millis, arXiv:1010.2251
[3]F. Elste, D. R. Reichman, and A. J. Millis, Phys. Rev. B **81**, 205413 (2010)

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