Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Effect of a strong spin-charge separation on tunneling into a 1D wire with impurity ANDREW MEYERTHOLEN, LINGFENG ZHANG, MICHAEL FOGLER, UCSD — We analyze the tunneling of electrons into a 1D nanowire with a large difference in velocities of spin and charge excitations: charges are "fast," spins are "slow." This system is modeled as a Wigner crystal of charges whose spins are ordered as in a antiferromagnetic Heisenberg spin chain. If the wire contains an impurity, electron tunneling in its vicinity causes a novel type of the orthogonality catastrophe. The tunneling electron shifts the charge distribution of a Wigner-crystal, which causes a shake-up processes in the spin sector. The corresponding suppression of the tunneling has a novel temperature dependence, which can be used for an experiemental validation of the spin-charge separation in low-density nanowires.

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Date submitted: 03 Dec 2006 Electronic form version 1.4