MAR08-2007-000352

Abstract for an Invited Paper
for the MAR08 Meeting of
the American Physical Society

**Fermi-Edge Singularity in a Spin-Incoherent Luttinger Liquid**

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In recent years the spin-incoherent Luttinger liquid, obtained in the energy window $E_{\mathrm{spin}} \ll k_B T \ll E_{\mathrm{charge}}$, has attracted much attention because of its qualitatively distinct properties relative to the more familiar Luttinger liquid [1]. Some of the most remarkable effects appear in correlations in which the number of particles is abruptly changed, such as a single particle Green's function [2] or in the Fermi-edge singularity when a particle-hole pair is photo-excited [3]. In this talk, I draw on the methods developed in Ref.[2] to study the Fermi-edge singularity in the spin-incoherent Luttinger liquid [3]. Both cases of finite and infinite core hole mass are explored, as well as the effect of a static external magnetic field of arbitrary strength. For a finite mass core hole the absorption edge behaves as $(\omega - \omega_{\mathrm{th}})^{\alpha}/\sqrt{|\ln(\omega - \omega_{\mathrm{th}})|}$ for frequencies $\omega$ just above the threshold frequency $\omega_{\mathrm{th}}$. The exponent $\alpha$ depends on the interaction parameter $K_c$ of the interacting one dimensional system, the electron-hole coupling, and is independent of the magnetic field strength, the momentum, and the mass of the excited core hole (in contrast to the spin-coherent case). In the infinite mass limit, the spin-incoherent problem can be mapped onto an equivalent problem in a spinless Luttinger liquid for which the logarithmic factor is absent, and backscattering from the core hole leads to a universal contribution to the exponent $\alpha$.

[1] G. A. Fiete, Rev. Mod. Phys. **79**, 801 (2007).
[2] G. A. Fiete and L. Balents, Phys. Rev. Lett. **93**, 226401 (2004).
[3] G. A. Fiete, Phys. Rev. Lett. **97**, 256403 (2006).