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Finite temperature ac conductivity of disordered Luttinger liquids ANDREAS GLATZ, Materials Science Division, Argonne National Laboratory, Argonne, Illinois 60439, USA, BERND ROSENOW, Physics Department, Harvard University, Cambridge, Massachusetts 02138, USA, THOMAS NATTERMANN, Institut fuer theoretische Physik, Universitaet zu Koeln, 50937 Koeln, Germany — Due to the strong effect of interactions in one spatial dimension, elementary charge excitations of a Luttinger liquid are plasmons. Backscattering of electrons from a random impurity potential creates single particle excitations, which strongly interact with these plasmons. In this way, backscattering from the impurity potential is modified by interactions and acquires a strong energy dependence first described in [1]. Based on a finite temperature renormalization group (RG) calculation [2], we determine the ac conductivity and include both the renormalization of the impurity strength and of the charge dynamics. The latter was neglected in [1], where the conductivity was calculated using the effective impurity strength obtained from the RG. We discuss the full frequency and temperature dependence of the conductivity and compare our results with those of [1].

[1] T. Giamarchi and H.J. Schulz, Phys. Rev. B 37, 325 (1988).

[2] A. Glatz and T. Nattermann, Phys. Rev. Lett. 88, 256401 (2002).

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