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Optical and DC conductivity in the two-dimensional $t - t' - t''$ Hubbard model near the antiferromagnetic quantum critical point[1] DOMINIC BERGERON, ANDRÉ-MARIE S. TREMBLAY, Dept. de physique, RQMP, Universite de Sherbrooke — We calculate the conductivity of the two-dimensional Hubbard model with second and third nearest neighbor hoppings t' and t'' for dopings in the vicinity of the antiferromagnetic quantum critical point (QCP) using the two-particle self-consistent approach. This approach is non-perturbative and was benchmarked against quantum Monte Carlo calculations from weak to intermediate coupling. We include vertex corrections that are the analogs of the Maki-Thompson and the Aslamazov-Larkin terms in the theory of paraconductivity, but for antiferromagnetic fluctuations. With these corrections the f-sum rule is satisfied and important effects in DC and optical conductivity are obtained. In the pseudogap regime induced by antiferromagnetic correlations, the resistivity increases with vertex corrections. This effect is stronger on the hole-doped side where the system changes from metallic to insulating. This is opposite to what is observed when $t' = t'' = 0$. On the non-magnetic side of the QCP, the resistivity decreases with vertex corrections.

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