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Metallic transport near a quantum critical point in organic superconductors from a renormalized Boltzmann theory MARYAM SHAHBAZI, CLAUDE BOURBONNAIS, Regroupement Qébecois des Matériaux de pointe, Département de Physique, Université de Sherbrooke, Sherbrooke, QC, Canada J1K 2R1 — The electrical and thermal transport properties of the normal state of quasi-1D superconductors like Bechgaard salts are investigated by combining the linearised Boltzmann equation and the renormalisation group (RG) method. The collision integral operator is calculated using the Umklapp scattering amplitudes obtained by the RG method yielding the electrical resistivity(ρ) and Seebeck coefficient(S). The power law dependence, $\rho(T) \sim T^{\alpha}$, for resistivity is obtained by changing the antinesting parameter $t'_{\perp}$ simulating the pressure distance from the quantum critical point (QCP) between spin-density-wave (SDW) and d-wave SC (SCd) in the phase diagram. The resistivity evolves from a linear component ($\alpha \simeq 1$) at the QCP towards a Fermi liquid component ($\alpha \simeq 2$) with increasing $t'_{\perp}$, which confirms an extended region of quantum criticality as a result of interference between SCd and SDW causing an anomalous growth of Umklapp scattering. Its anisotropy is also tied to the $k_{\perp}$-dependence of hot/cold scattering regions along the Fermi surface. Similar calculations for the Seebeck coefficient show deviations from the usual linear temperature dependence and also a change of sign near a SDW instability.

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