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Superconductivity close to a charge-density-wave instability[1]
CLAUDE BOURBONNAIS, HASSAN BAKRIM, Departement de physique, Universite de Sherbrooke, Sherbrooke, Quebec, Canada J1K-2R1 — The recent discovery of superconductivity (SC) in proximity of a Peierls distorted phase in the perylene based organic conductor $Per_2Au(mnt)_2$ [1] has raised once again the issue about the role of charge-density-wave (CDW) correlations in the mechanism of Cooper pairing. We have applied the renormalization group approach to a quasi-1D model of electrons interacting with acoustic phonons modes and studied the interplay between the two instabilities. From the one-loop flow equations for the momentum and frequency dependent interactions induced by phonons we analyze the stability of CDW and SC states *vs* the phonon frequency ω_D and the hopping parameter $t'_\perp$ for nesting alterations. S-wave SC is demonstrated to be stabilyzed above some critical $t'^*_\perp$. In these conditions, the superconducting $T_c \sim \omega_D^\eta$ exibits a non-BCS power law increase with $\omega_D(\eta \simeq 0.7)$, as a result of quantum interfering CDW and SC pairings. The complete phase diagram is obtained as a function of both $t'_\perp$ and ω_D and shown to agree with the one found for $Per_2Au(mnt)_2$ under pressure [1].

[1] D. Graf *et al.,* Eur. Phys. Lett. **85**, 27009 (2009).

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