Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

The role of electron-phonon interaction in a magnetically driven mechanism for superconductivity[1] CLAUDE BOURBONNAIS, HASSAN BAKRIM, Regroupement Québecois des Matériaux de Pointe, Département de physique, Université de Sherbrooke, Sherbrooke, QC, Canada J1K 2R1 — We use the renormalization group method to examine the effect of phonon mediated interaction on d-wave superconductivity driven by spin fluctuations in a quasi-one-dimensional electron system. The influence of a tight-binding electron-phonon interaction on the spin-density-wave and d-wave superconducting instability lines is calculated alongside its effect on the amplitude of spin correlations in the normal phase for arbitrary phonon frequency and antinesting of the Fermi surface. We show the existence of a positive isotope effect for spin-density-wave and d-wave superconducting critical temperatures that scales with the antinesting distance from quantum critical point where the two instabilities merge. We also study the electron-phonon strengthening of spin fluctuations at the origin of extended quantum criticality in the metallic phase above superconductivity. The impact of our results on quasi-one-dimensional organic conductors like the Bechgaard salts where a Peierls distortion is absent and superconductivity emerges near a spin-density-wave state under pressure is emphasized.

[1]Work supported by NSERC and FQRNT.

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Date submitted: 14 Nov 2013 Electronic form version 1.4