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A Generalized fRG Solver for Material Systems

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We summarize recent work with Nahom YIrga on the development of a generalized functional Renormalization-tion Group (fRG) approach to condensed matter systems. Our approach combines momentum decoupling (as in standard RG calculations) with frequency decoupling (as in the dynamical mean field theories) and band decoupling (necessary to study the multiband models that apply to various high temperature superconductors and related materials). Importantly, we are able to include both electron-electron interactions and electron-phonon interactions in our solver. We give examples of applications of two- and three-band models for the Cuprate superconductors and of the effects of both Holstein and Su-Schrieffer-Heeger phonons on the phase diagrams of two-dimensional Hubbard models of strongly correlated systems.

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