

Abstract Submitted
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Phonon-induced many-body renormalization of graphene electronic properties¹ WANG-KONG TSE, SANKAR DAS SARMA, University of Maryland — In this talk, we present a many-body theory for the electron-phonon interaction effects on the electronic properties of graphene. We provide analytical results for the electron self-energy, spectral function, and band velocity renormalization due to phonon-mediated electron-electron interaction, showing that phonon-mediated electron-electron coupling has a large effect on the graphene band structure renormalization. Our analytic theory successfully captures the essential features of the observed graphene electron spectra in the angle-resolved photoemission spectroscopy (ARPES) experiments, predicting a kink at $\sim 200\text{meV}$ below the Fermi level and a reduction of the band velocity by $\sim 10 - 20\%$ at the experimental doping level.

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