

Abstract Submitted
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Dephasing time in graphene due to interaction with flexural phonons WEI ZHAO, KONSTANTIN TIKHONOV, ALEXANDER FINKEL'STEIN, Texas A&M Univ — We investigate decoherence of an electron in graphene caused by electron-flexural phonon interaction. We find out that the flexural phonons can produce dephasing rate comparable to the electron-electron one. The problem appears to be quite special because there is a large interval of temperatures where dephasing rate cannot be obtained using the golden rule. We evaluate this rate for a wide range of density (n) and temperature (T) and determine several asymptotic regions with temperature dependence crossing over from $\tau_\phi^{-1} \sim T^2$ to $\tau_\phi^{-1} \sim T$ when temperature increases. We also find τ_ϕ^{-1} to be a non-monotonous function of n . These distinctive features of the new contribution can provide an effective way to identify flexural phonons in graphene through the electronic transport by measuring the weak localization corrections in magnetoresistance.

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