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Dephasing time in graphene due to interaction with flexural phonons WEI L.Z 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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