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Ultrafast Electron Dynamics in hBN-Encapsulated Graphene[1]

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We perform ultrafast transient absorption spectroscopy on high quality graphene encapsulated in hexagonal boron nitride and non-encapsulated graphene on a silicon-silicon dioxide substrate, using a near-IR pump and a mid-IR probe. We measure the transient absorption signal as a function of graphene doping and pump fluence for both room temperature and 77K, and compare our results to models taking into account the interband and intraband electronic transitions in graphene. We compare our experimental carrier lifetimes to theoretical models to investigate the electron decay mechanisms in high quality graphene.

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