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Probing the graphene-plasmon interaction via ultrafast pump-probe studies of CVD graphene-metal nanostructures ADAM GILBERTSON, TYLER ROSCHUK, DOMINIC MOSELEY, THEMIS SIDIROPOULOS, YAN FRANCESCATO, VINCENZO GIANNINI, STEFAN MAIER, RUPERT OULTON, LESLEY COHEN, Imperial College London, PHYSICS DEPARTMENT COLLABORATION — Graphene exhibits ultrafast broadband absorption that has attracted considerable interest for optoelectronic applications. A major hurdle for real applications is the low optical absorption (2.3%) of graphene, limited by its atomic thickness. A promising approach is to integrate graphene with metal nanostructures that concentrate light into nanoscopic volumes, promoting stronger absorption effects.[1] Here we present progress towards integration of nanostructured metals with commercially available CVD graphene into photoconductive device architectures. Through fs pump-probe measurements conducted at 300K, hot carrier dynamics in these graphene-plasmonic systems have been studied. We will discuss both the spectral and polarization dependent dynamic response of these systems and the impact of the nanostructures on the resulting photoconductive device performance.

[1]T. J. Echtermeyer, et al., Nature Communications 2, (2011).

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