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Enhanced quantum coherence in graphene by plasmon coupling[1]
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The quantum coherence plays a crucial role in solid-state quantum computation. Here we report a substantial enhancement of quantum coherence in graphene in proximity to Au nanoparticles with the excitation of Au plasmons under laser illumination, as evidenced by the weak localization characterizations at low temperatures. This effect is more prominent with increasing laser power and decreasing temperature, whereas the optical doping in the graphene is negligible. The enhanced quantum coherence could be attributed to the suppression of electron-electron dephasing by electron-plasmon coupling. Our findings may provide insights into the design of graphene-based quantum device controlled by plasmons.

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