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Enhanced Double Resonance Raman Scattering in Multilayer Graphene with Broadband Coherent Anti-Stokes Raman Spectroscopy

Abstract

Graphene's unique gapless band structure and remarkably large third-order optical susceptibility have drawn significant attention to its nonlinear optical response, particularly in the context of coherent anti-Stokes Raman scattering (CARS). Under the combined influence of phononic and electronic resonances, the CARS response of graphene has been observed to exhibit a distinctive feature of time-resolved dip-to-peak evolution. Here, we report a greatly enhanced double resonance Raman mode beyond G mode of multi-layer graphene with broadband CARS measurements. The significant difference in intensity ratio between CARS and SR for this mode may be attributed to the preferential activation of low-frequency phonons in the impulsive stimulated Raman scattering process (ISRS) and a lower dephasing rate. Our results build on foundation towards a deeper exploration of coherent Raman response of two-dimensional materials.

References

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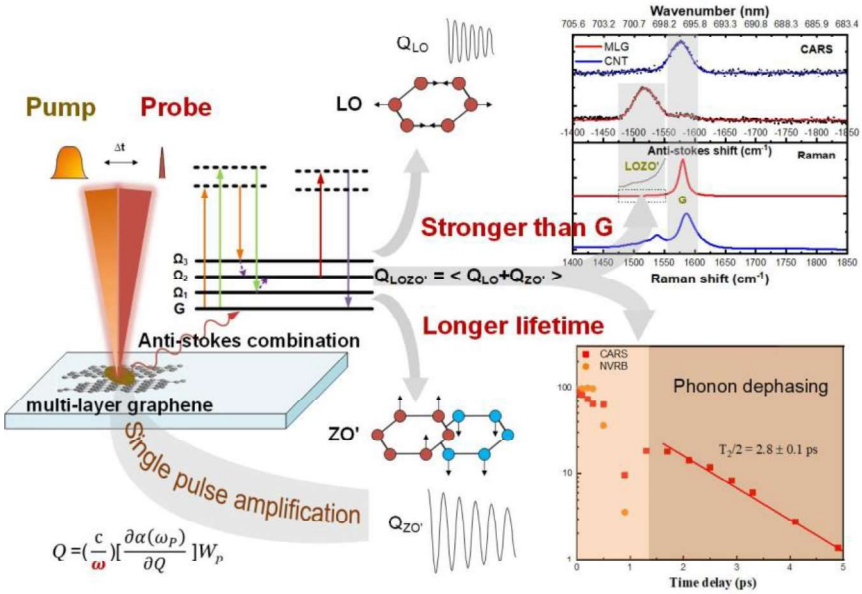
Figures



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