Deep-ultraviolet Raman scattering studies of two dimensional materials

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We present joint experimental and theoretical investigations of the deep-ultraviolet Raman scattering spectra of two dimensional materials. The Raman scattering intensities from the second-order phonon modes of monolayer graphene and monolayer transition metal dichalcogenides (MoS$_2$ and WS$_2$) thin films are revealed to be decreased or enhanced anomalously by the deep-ultraviolet excitation wavelength [1-3]. We demonstrate theoretically that such resonant behavior has a strong correlation with the absorption properties and electron-phonon interactions in these materials. These results advance our understanding of the double resonance Raman scattering process in monolayer nanomaterials and provide a foundation for the technological development of these materials in the deep-ultraviolet frequency range.

REFERENCES