Coherence and symmetry aspects of nano-Raman spectroscopy applied to two-dimensional materials

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Abstract

Studies of substrate-related optical activity in transition metal dichalcogenides [1], contaminations in $MoSe_2$ [2,3], tellurium nanowires of different diameters [4], collagen fibrillogenesis [5] and even the optical properties of cicada wings covered with graphene [6] are a diverse set of recent applications of tip-enhanced Raman spectroscopy [7]. The various results pointed to an unexpected high efficiency of our nano-Raman setup, based on a bottom-illuminated radially polarized system coupled to a plasmonic bi-cavity nanoantenna [8]. With this understanding in place and further developments in TERS theory, including coherence and symmetry aspects [9], we rationalize the anomalous tip-sample distance behaviour observed in graphene at ambient conditions [9] and provide quantitative analysis for defects and contaminations in 2D systems [10].

References

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