Nanoscale second harmonic generation investigations of 2D materials

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Abstract

Nonlinear optical responses are closely correlated to the crystal symmetry, electronic structure and phase transition of materials. In the emerging field of van der Waals (vdW) heterostructures, second harmonic generation is a powerful tool for probing twist angle, excitonic transition, and interlayer coupling.

In this talk, I will describe our works on understanding and engineering nonlinear optics in vdW heterobilayers and dynamically twistable micro rotators. I will also focus on discussing the development and challenges of near-field second harmonic generation techniques, with intriguing applications in probing local crystal symmetry, edge states, and the heterogeneous interlayer coupling at the nanoscale.