

Abstract Submitted
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Toward Nanoscale Magnetometry of Van der Waals Heterostructures using Nitrogen-Vacancy Centers in Diamond THOMAS MITTIGA, SATCHER HSIEH, CHONG ZU, CHENHAO JIN, JONGHWAN KIM, BRYCE KOBRIN, FENG WANG, NORMAN YAO, Univ of California - Berkeley — Two-dimensional layered heterostructures remain at the forefront of materials research and are promising candidates from the perspective of both fundamental science and technological advancement. They can exhibit a rich array of magnetic phenomena, with recent experiments in transition metal dichalcogenides (TMD) demonstrating long-lived spin relaxation and coherence times. We present first steps toward a wide-field confocal microscope aimed at probing the exciton and defect-based magnetism of such materials. By observing the quenching of fluorescence from single Nitrogen-Vacancy centers of predetermined depths, we measure the transition dipole moment of the TMD and characterize this as a function of layer number. We also describe recent progress toward the imaging of magnetic defects and evaluate the feasibility of using this scheme to probe coupled spin and valley dynamics.

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