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Electronic and Structural Symmetry of Quantum Emitters in Hexagonal Boron Nitride[1] ANNEMARIE EXARHOS, DAVID HOPPER, RICHARD GROTE, JENNIFER SAOUAF, University of Pennsylvania, AUDRIUS ALKAUSKAS[2], Center for Physical Sciences and Technology, LEE BASSETT, University of Pennsylvania — Analogous to three-dimensional wide-bandgap semiconductors like diamond and silicon carbide, hexagonal boron nitride (h-BN) hosts isolated defects exhibiting single-photon emission at room temperature. The ability to create quantum emitters within a two-dimensional material promises breakthrough advances in quantum sensing, photonics, and use in multi-functional heterostructures. Critical to such applications, however, is an understanding of the physics underlying h-BN's quantum emission. Here, we characterize the angular dependence of h-BN defect fluorescence as a function of excitation polarization. Using single-crystal exfoliated h-BN films treated to create quantum emitters, we study correlations between the defect dipole orientation and the h-BN crystallographic axes with fluorescence spectroscopy and electron backscatter diffraction. Initial studies indicate a weak correlation of the absorptive dipole with the h-BN lattice, although some dipoles are notably uncorrelated with the lattice (Exarhos *et al.*, arXiv:1609.02641 (2016)). Additionally, grain boundaries and local lattice strain may play a role in the absorptive dipole orientation.

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