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Quantm confined stark effect of single photon emitters in atomically thin semiconductors CHITRALEEMA CHAKRABORTY, Materials Science, University of Rochester, KENNETH GOODFELLOW, SAJAL DHARA, NICK VAMIVAKAS, The Institute of Optics, University of Rochester — The optical properties of semiconducting monolayer materials have been widely studied since the isolation of monolayer transition metal dichalcogenides (TMDCs). They have rich opto-electronic properties owing to their large direct bandgap, the interplay between the spin and the valley degree of freedom of charge carriers, and the recently discovered localized excitonic states giving rise to single photon emission. We study quantum confined Stark shift from these localized emitters present on the edges of monolayer tungsten diselenide. We employ a vertically stacked van der Waal's heterostructure to fabricate a field effect device using hexagonal boron nitride as the tunnel barrier on either side of the TMDC and few layer graphene as top and bottom electrical contacts. We report the Stark shift of different defect centers to have linear or both linear and quadratic behavior with electric field. Further, evaluation of the spectral shift in the photoluminescence signal as a function of the applied voltage enables us to extract the polarizability as well as information on the dipole moment of an individual defect center.

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