## Abstract Submitted for the MAR16 Meeting of The American Physical Society

Single Quantum Emitters in Monolayer Tungsten Diselenide GENEVIEVE CLARK, JOHN SCHAIBLEY, JASON ROSS, University of Washington, YU-MING HE, YU HE, University of Science and Technology of China, WANG YAO, The University of Hong Kong, CHAOYANG LU, JIANWEI PAN, University of Science and Technology of China, XIAODONG XU, University of Washington — Single quantum emitters are essential for developing photonic quantum technologies, providing single photon sources as well as stationary quantum bits. While they have been realized in a variety of solid state systems including single quantum dots and color centers in diamond, their three dimensional bulk matrix will be difficult to integrate with emerging nanoscale devices. We present single quantum emitters in a two-dimensional semiconductor, in the form of excitons localized to defects within atomically thin Tungsten Diselenide monolayers. These localized excitons show strong photoluminescence with 130 eV emission lines from two non-degenerate, cross-polarized transitions. Second-order correlation measurements show strong photon anti-bunching, establishing that these localized excitons are single photon emitters. Magneto-optical measurements reveal an exciton gfactor of 8.7, significantly larger than that of delocalized excitons. In addition to potential advantages such as efficient photon extraction and in-situ control of local environment, the two-dimensional matrix can be incorporated into more complex van-der-Waals heterostructure devices. This enables external control of emitters in the semiconductor, while integrating seamlessly with nanoscale device architectures.

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