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Quantum Emission from Defects in ZnO N.R. JUNGWIRTH, E.R. MACQUARRIE, H.S. CHANG, G.D. FUCHS, Cornell University — Single defects in wide bandgap semiconductors, such as nitrogen-vacancy centers in diamond, are promising candidates for solid state qubits and single photon sources. Additionally, single defect studies provide an opportunity to probe properties and dynamics that are washed out of ensemble measurements. Despite the wealth of available semiconducting hosts, investigations of isolated defects in semiconductors other than diamond are limited. Here we present confocal photoluminescence measurements of ZnO nanocrystals that are excited with below bandgap light to selectively address individual deep levels. In addition to wavelength-resolved and time-resolved photoluminescence measurements, we report photon anti-bunching that is consistent with quantum emission from isolated defects. These measurements, made at the single and few defect level, enable insight into long-standing questions that surround defect emission in ZnO.

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