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Observation of Synchronous Photoluminescence Intensity Fluctuations within Single CdSe Quantum Wires JOHN GLENNON, RUI TANG, WILLIAM BUHRO, RICHARD LOOMIS, Department of Chemistry and Center for Materials Innovation Washington University in St. Louis — The intensity of the photoluminescence (PL) within single colloidal CdSe quantum wires (QWs) is observed to synchronously fluctuate along the entire length of the wire in time. Statistical analysis of ‘on’ and ‘off’ events within the QWs indicates a power-law temporal dependence nearly identical to that seen in colloidal CdSe quantum dots (QDs). The low PL quantum yields (0.2-2%) of ensemble samples of CdSe QWs suspended in solution are placed in perspective by considering the large inhomogeneity observed in the PL intensities of different QWs. Estimates of the quantum yields for the ‘on’ events in CdSe QWs are similar to those of CdSe QDs. We also report on the observation of coordinated PL intensity fluctuations in multiple QWs that lie in contact with each other, a surprising entity dubbed a quantum network.

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