

MAR15-2014-004000

Abstract for an Invited Paper  
for the MAR15 Meeting of  
the American Physical Society

### **Exciton Dynamics in Quantum Dot Films and Interfaces<sup>1</sup>**

WILLIAM TISDALE, Massachusetts Inst of Tech-MIT

Colloidal quantum dots (QD) are a promising material platform for solution-processable optoelectronic devices such as solar cells, light-emitting diodes, thermoelectric modules, and flexible electronics. Central to the operation of these devices is the formation, transport, and conversion of free charges and excitons. In the first part of the talk, I will present a comprehensive study of exciton diffusion in inhomogeneously broadened QD assemblies, including spectrally-resolved transient photoluminescence spectroscopy, transient photoluminescence quenching, time-resolved optical imaging, and kinetic Monte Carlo simulations. In the second part of the talk, I will show how nanoscale dielectric screening phenomena in atomically thin semiconductors such as MoS<sub>2</sub> can lead to counterintuitive energy transfer behavior from QD donors.

<sup>1</sup>Department of Energy, Office of Basic Energy Sciences: DE-SC0001088