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Multiple recombination centers model of fluorescence intermittency of single colloidal semiconductor quantum dots[1] PAVEL FRANTSUZOV, SANDOR VOLKAN-KACSO, University of Notre Dame, BOLDIZSAR JANKO, University of Notre Dame and Institute for Theoretical Sciences — We present a new physical model resolving a long-standing mystery of the power-law distributions of the blinking times in single colloidal quantum dot fluorescence. The model considers the non-radiative relaxation of the exciton through multiple recombination centers. Each center is allowed to switch between two quasi-stationary states. We point out that the conventional threshold analysis method used to extract the exponents of the distributions for the on-times and off-times has a serious flaw: The qualitative properties of the distributions strongly depend on the threshold value chosen for separating the on and off states. Our new model explains naturally this threshold dependence, as well as other key experimental features of the single quantum dot fluorescence trajectories, such as the power-law power spectrum (1/f noise).

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