energy levels in QDs.

Several types of nanocrystals have recently shown nonblinking or nearly nonblinking behavior [5–7]. significantly reduced blinking has also been observed by modification of the surrounding matrix of the QDs [24]. Based on the above understanding, efficient elimination of surface trapping and rapid nonradiative recombination upon trapping are sufficient to eliminate blinking. Long Auger recombination lifetimes are not required for this to occur, but help in supporting a high quantum yield despite the existence of traps with relatively slow nonradiative recombination lifetimes.

In summary, the data presented demonstrates that Auger recombination alone cannot account for QD blinking. The comparison of the decay curve intensity dependence for the 'on' and 'off' states suggests that the darkening of QDs involves fast trapping of a charge carrier in a relatively short lived trap state, as opposed to the conventional idea of the a charge trapped throughout the entire 'off' time. The operation of QDs during the 'off' times can therefore be described as a three-step cyclic process of excitation, trapping and slow non-radiative relaxation. This phenomenological model can serve as a basis for the future research on the microscopic mechanisms of QD blinking.

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