

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Nanoscale engineering of photoelectron kinetics in quantum dot structures** ANDREI SERGEEV, VLADIMIR MITIN, NIZAMI VAGIDOV, SUNY at Buffalo — We investigate photoelectron kinetics in advanced quantum dot (QD) structures, which combine quantum tuning of localized and conducting states with controllable photoelectron properties. Our unique approach is based on engineering of photoelectron capture processes using various configurations of manageable potential barriers around single QDs and collective barriers around QD planes (lateral structures) and QD clusters (vertical structures). Potential barriers around QDs are formed by electrons bounded in dots and ionized impurities in the depletion region. These potential barriers separate the conducting electron states from the localized intra-dot states. Besides manageable photoelectron lifetime, the novel structures will also provide high scalability, low generation-recombination noise in sensing applications and low recombination losses in QD solar cells.

Andrei Sergeev  
SUNY at Buffalo

Date submitted: 30 Nov 2010

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