Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Energy relaxation and phonon bottleneck in semiconductor quantum dots SERGUEI GOUPALOV, Los Alamos National Lab — We show explicitly that the so-called phonon bottleneck in energy relaxation in semiconductor quantum dots arises as a limiting case of a more general model originally due to Huang and Rhys [S.V.Goupalov, Phys. Rev. B **72**, 073301 (2005)]. Therefore, the restrictions on the energy relaxation imposed by the phonon bottleneck are much less fundamental than it is commonly believed. We calculate temperature dependence of the non-radiative multiphonon transition rate within the properly corrected Huang-Rhys model and discuss other models where the phonon bottleneck is circumvented in connection with recent experiments on epitaxial and colloidal quantum dots.

Serguei Goupalov
Los Alamos National Lab

Date submitted: 29 Nov 2005 Electronic form version 1.4