Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Nonlinear Optical Properties of CdSe Quantum Dots CHARLES ANDERSON, SEAN BENTLEY, JOHN DOOHER, Adelphi University — Detailed research into the nonlinear optical properties of several quantum dot samples is conducted. Data from the research is being used to investigate applications for the quantum dots. Possible applications may include quantum encryption for more secure forms of communication, lithography techniques for improved capabilities of writing computer chips, and the generation of entangled photons through the use of a four-wave mixing process. Other applications may also include more efficient and cheaper photovoltaic cells. Evident Technologies has provided several different samples of quantum dots, each with distinct nonlinear properties. Using z-scan techniques, absorptive and refractive information are extracted for each of the samples. The absorptive natures are observed by scanning the dot sample through varying intensities and measuring their transmission values with an open aperture. Comparing these values with the same process, but utilizing a closed aperture, allows extraction of values of n_2, the nonlinear refractive index.

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Date submitted: 23 Nov 2005 Electronic form version 1.4