

Simulation of Quantum Dots

Group project

Laboratory for Nanoelectronics
Prof. Vanessa Wood
Integrated Systems Laboratory
Department of Information Technology & Electrical Engineering
ETH Zurich

> Date May 10, 2013

Supervisor: Prof. Vanessa Wood

Prof. Mathieu Luisier

Christian Funck Plattenstrasse 71 8032 Zürich 09-920-177 cfunck@student.ethz.ch Matthias Dittberner Luegislandstrasse 269 8051 Zürich 09-913-450 mdittber@student.ethz.ch

Contents

Index	1
References	1
List of Tables	2
Declaration of Originality	5

iv CONTENTS

Bibliography

- [1] John D. Dow Robert S. Allgaier Otto F. Sankey Craig S. Lent, Marshall A. Bowen and Eliza S. Ho. Relativistic empirical tight-binding theory of the energy bands of gete, snte, pbte, pbse, pbs, and their alloys. *Superlattices and Microstructures*, 2(5):491–499, 1986.
- [2] Olesya Yarema Deniz Bozyigit, Michael Jakob and Vanessa Wood. Deep level transient spectroscopy (dlts) on colloidal-synthesized nanocrystal solids. November 2012.
- [3] Al. L. Efros and M. Rosen. The electronic structure of semiconductor nanocrystals. *Annual Review of Materials Science*, 30:475–521, 2000.
- [4] Alexander H. Ip et. al. Hybrid passivated colloidal quantum dot solids. *nature nanotechnology*, 7(9):577–582, September 2012.
- [5] Edward H. Sargent Jiang Tang. Infrared colloidal quantum dots for photovoltaics: Fundamental and recent progress. *Advanced Materials*, 23(1):12–29, January 2011.
- [6] Victor I. Klimov. Nanocrystal Quantum Dots. CRC Press, Second Edition edition, 2010.
- [7] Gianluca Calestani Andrea Migliori Antonietta Guagliardi Ludovico Cademartiri, Erica Montanari and Geoffrey A. Ozin. Size-dependent extinction coefficients of pbs quantum dots. *Journal of the American Chemical Society*, 128(31):10337–10346, August 2006.
- [8] Mathieu Luisier. OMEN Manual. ETH Zürich, Integrated Systems Laboratory, October 2012.
- [9] Gregory D. Scholes Margaret A. Hines. Colloidal pbs nanocrystals with size-turnable near-infrared emission: Observation of post-synthesis self-narrowing of the particle size distribution. *Advanced Materials*, 15(21):1844–1849, November 2003.

2 BIBLIOGRAPHY

List of Tables

4 LIST OF TABLES

Declaration of Originality

We hereby declare that the written work we have submitted entitled

Simulation of Quantum Dots

is original work which we alone have authored and which is written in our own words.

Authors

LAST NAME FIRST NAME
Dittberner Matthias
Funck Christian

Supervisors

Last name First name Degree Luisier Mathieu Professor Wood Vanessa Professor

With the signature we declare that we have been informed regarding normal academic citation rules and that we have read and understood the information on *Citation etiquette* (http://www.ethz.ch/students/exams/plagiarism_s_en.pdf). The citation conventions usual to the discipline in question here have been respected. The above written work may be tested electronically for plagiarism. ¹

Place and date Christian Funck Place and date Matthias Dittberner

¹Based on the official Declaration of ETH Zurich: http://www.ethz.ch/faculty/exams/plagiarism/confirmation_en.pdf