

PROJECT OVERVIEW: Quantitative excited state spectroscopy of a single InGaAs quantum dot molecule

I INTRODUCTION

- Study of optical properties in a GaInAs quantum dot molecule
- Which physical effects govern optical device properties of quantum dots?

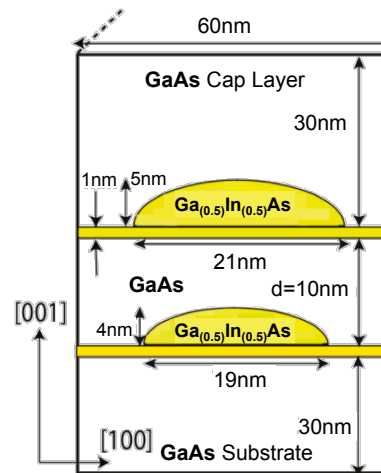
II METHODOLOGY

- Extensive atomistic modeling via NEMO3D
- Consideration of piezoelectric strain effects

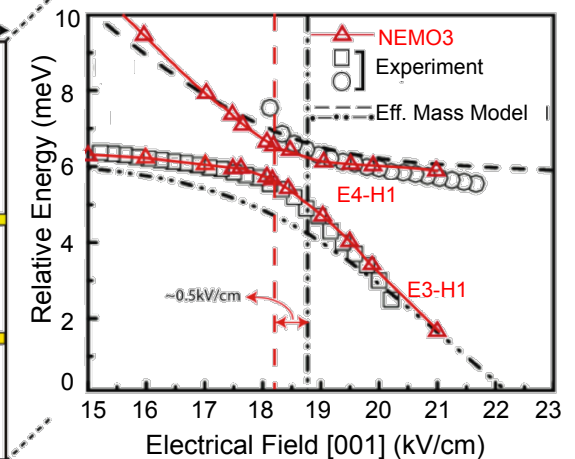
III RESULTS

- Good match of experimental excitonic emission spectrum using atomistic modeling approach
- Strain-induced piezoelectricity to be found crucial in matching optical absorption strengths
- Published in *Nanotechnology*, 22, 315709 2011 (M. Usman & Y.-H. M. Tan)

1 Simulation domain



2 Excitonic emission spectrum

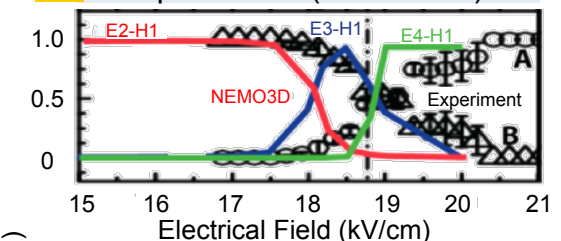


1) Atomistic simulation domain of QD molecule in NEMO

2) Comparison of excitonic emission spectrum with NEMO results

3-4) Optical absorption strengths with/without piezoelectric effects (PE)

3 Optical abs. (without PE)



4 Optical absorp. (with PE)

