

Jun-Wei Luo

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Objective

Has considerable experience in developing atomistic, quantum-mechanical simulation methods for million-atom nanostructures and nanometer scale field-effect transistors. He currently focuses on theoretical prediction and design of semiconductor information materials for semiconductor optoelectronic (quantum) integrated circuit technologies.

Education

- B.S. | 2000 | Physics | Zhejiang University, China
- M.A. | 2003 | Theoretical Physics | Zhejiang University, China
- Ph.D. | 2007 | Condensed Matter Physics | Institute of Semiconductors, CAS, China

Experience

Jan. 2016 – Present

Associate Director | State Key Laboratory of Superlattices and Microstructures | Institute of Semiconductors, Chinese Academy of Sciences | Beijing, China

Jan. 2014 – Present

Professor | Group Leader, Computational Materials and Devices Group | State Key Laboratory of Superlattices and Microstructures | Institute of Semiconductors, Chinese Academy of Sciences | Beijing, China

Nov. 2013 – Jan. 2014

Senior Scientist | National Renewable Energy Laboratory | Golden, CO, USA

Sept. 2009 – Nov. 2013

Staff Scientist | National Renewable Energy Laboratory | Golden, CO, USA

Jan. 2007 – Sept. 2009

Postdoctoral Fellow | National Renewable Energy Laboratory | Golden, CO, USA

Awards & Acknowledgements

- The “Youth 1000-Talent Plan” of China (2014)
- Evaluation expert of the National Science and Technology Award
- NREL’s principal investigator (PI) on U.S. department of energy (DOE) projects
"Development of III-Sb Quantum Dot Systems for High Efficiency Intermediate Band Solar Cells" (\$1.5M, 2011/10-2015/09)
- Theory Leader in the "Silicon Quantum Dot Solar Cells" (\$1.1M, 2007/10-2011/09)
- Theory Leader in the DOE project "Next generation Si PV" (\$9M, 2012/10-2015/09)

Selected recent publications

1. H.X. Deng, **Jun-Wei Luo***, S.S. Li and S.H. Wei*, “Origin of the Distinct Diffusion Behaviors of Cu and Ag in Covalent and Ionic Semiconductors”, **Phys. Rev. Lett.** 117, 165901 (2016).
2. H. Wei, **Jun-Wei Luo***, S.S. Li, and L.W. Wang*, “Revealing the Origin of Fast Electron Transfer in TiO₂ Based Dye-Sensitized Solar Cells”, **J. Am. Chem. Soc.** 138, 8165 (2016).
3. I. Sychugov*, F. Sangghaleh, B. Bruhn, F. Peveri, **Jun-Wei Luo***, A. Zunger, and J. Linnros, “Strong Absorption Enhancement in Si Nanorods”, **Nano Letters** 16, 7937 (2016).
4. B. G. Lee*, **Jun-Wei Luo***, N. R. Neale, M. C. Beard, D. Hiller, M. Zacharias, P. Stradins, and A. Zunger, “Quasi-Direct Optical Transitions in Silicon Nanocrystals with Intensity Exceeding the Bulk”, **Nano Letters** 16, 1583 (2016).
5. X.W. Jiang*, **Jun-Wei Luo***, S.S. Li, L.W. Wang, “How Good is Mono-Layer Transition-Metal Dichalcogenide Tunnel Field-Effect Transistors in sub-10 nm? - An ab initio Simulation Study”, 2015 **IEDM Tech. Dig.** p12.4. (2015).
6. **Jun-Wei Luo***, G. Bester, A. Zunger, “Supercoupling between heavy-hole and light-hole states in self-assembled quantum dots”, **Phys. Rev. B** 92, 165301 (2015).
7. X.W. Zhang, Q.H. Liu, **Jun-Wei Luo***, A. Freeman, and Alex Zunger*, “Hidden spin polarization in inversion-symmetric bulk crystals”, **Nature Physics** 10, 387 (2014).
8. M. Gong*, B. Hofer, E. Zallo, R. Trotta, **Jun-Wei Luo***, A. Zunger, O.G. Schmidt, C. Zhang, "Statistical Properties of Exciton Fine Structure Splittings and Polarization Angles in Quantum Dot Ensembles", *Phys. Rev. B* 89, 205312 (2014).
9. L. Zhang, **Jun-Wei Luo**, A. Saraiva, B. Koiller, and Alex Zunger, “Genetic design of enhanced valley splitting towards a spin qubit in silicon”, **Nature Communications** 4, 2396 (2013).
10. Mayeul dAvezac, **Jun-Wei Luo**, T. Chanier, and Alex Zunger, “Genetic engineering of a direct-gap and optically-allowed superstructure from indirect-gap Si and Ge materials, **Phys. Rev. Lett.** 108, 027401 (2012).