

Curriculum Vitae – Peter Lodahl (February 2014)

Personal details

Title and name: Prof. Dr. Peter Lodahl.
Date and place of birth: August 9, 1972 in Ribe, Denmark.
Private status: Married, 2 children
Address: J.N. Vinthers Vej 11, 3460 Birkerød, Denmark.

Education

M.Sc. Degree: Physics and Mathematics, University of Aarhus, March 20, 1997.
Ph.D. Degree: University of Copenhagen, November 9, 2000.

Work experience since graduation

Oct. 2013 – Jan. 2014: Visiting professor, University of Queensland, Brisbane.
Sep. 2011 – present: Full professor of physics (vocation) and leader of “Quantum Photonics Group” at Niels Bohr Institute, University of Copenhagen
Jun. 2007- Aug. 2011: Assoc. prof. and leader of “Quantum Photonics Group” at DTU Fotonik.
Apr. 2005 – May 2007: Research assoc. prof. at COM•DTU, Technical University of Denmark.
Mar. 2002 – Mar. 2005: Postdoc, Complex Photonic Systems, MESA⁺ Institute, University of Twente, The Netherlands.
Jan. 2001 – Jan. 2002: Postdoc, California Institute of Technology (Caltech), USA.

Publications

- **76** articles in peer-reviewed journals incl. **18** articles in Nature, Science, Nature Physics/Nanotechnology, and Physical Review Letters (**14** of these with PL as first or last author).
- Total number of citations: **>2100** (ISI Web of Science), **>31** (Google Scholar). h-index: **23** (ISI) and **29** (Google Scholar).
- **5** book chapters. **11** articles in popular journals.
- **70** invited colloquia and conference talks including keynote and plenary talks.
- **>90** peer reviewed conference contributions.

Personal awards and grants

- ERC consolidator grant for ”All-solid state quantum electrodynamics in photonic crystals (ALLQUANTUM)”, 2010.
- The Danish Research Councils' Young Researcher's Award, 2005 (unapplied).
- “Skou fellowship” from the The Danish Research Council (FNU), 2005.

Science management and training

- Attracted **>40** MKr (PI part only) from ERC, Danish Research Council, “Villum Fonden”, “Lundbeck Fonden”, “A.P. Møller Fonden”, and “Augustinus Fonden” 2005-2013.
- Leader of “Quantum Photonics Group” at the Niels Bohr Institute (~ 20 students and staff).
- Established independent and new research direction in Denmark on solid-state quantum photonics including building up state-of-the-art labs for optical experiments and nanofabrication, 2005-today.
- Supervisor of 20 M.Sc. students, 21 Ph.D. students, 12 postdocs, 1 assist. prof., and 1 assoc. prof., 2005-today.

Other academic activities

- Regular reviewer for Nature, Science, Nature Physics, Nature Photonics, Nature Comm., Physical Review Letters, A, B, E & X, Opt. Letters, Opt. Express, Applied Physics Letters etc.
- Reviewer of i) FET projects for the European Commission ii) European Research Council (ERC) starting grants, iii) SNSF professorship applications iv) Europe-wide cooperation and coordination of national research activities (COST), v) US Civilian R&D Foundation.
- Member of review board of “Leibniz Institute for Solid State and Materials Research Dresden”, July 7-8, 2014.
- Organizer of symposium “Frontiers in Quantum Optics – symposium in commemoration of Eugene Polzik’s 60th birthday”, Niels Bohr Institute, October 2nd, 2013.
- Member of scientific organizing committee for IEEE Photonics Conference 2012 and NOEKS 2014.
- Head of evaluation committee for appointment of full professor at NBI (2011).
- Organizer of symposium on “Solid state quantum-information technology”, DTU, 2010.

Brief selection of press coverage

- ”Kvantespøgelset i maskinen”, B. Christensen, *Weekendavisen*, October 19th, 2012.
- ”Uorden er vejen til chips i kvantecomputere”, *Ingeniøren*, March 2010.
- ”Imperfections are perfect”, *Alpha Galileo*, March 2010.
- ”Quantum computing thrives on chaos”, *Wired Science*, March 2010.
- ”Imperfect chips enhance quantum technology”, *Photonics.com*, March 2010.
- ”Shoddy construction beats precision in quantum world”, *New Scientist*, March 2010.
- ”For quantum computer, add a dash of disorder”, *Science News*, March 2010.
- ”A broadband single-photon source”, M. Marquit, *Physorg*, September 19, 2008.
- ”Danmarks elite”, *Berlingske Nyhedsmagasin*, January 27, 2006.
- ”På vej mod fremtidens kvantecomputer”, *Momentum (Kundemagasin for Microsoft Danmark)*, September, 2005.
- ”Lyset under kontrol “, *Jyllands Posten*, November 24 (2004).
- *NOS 8 uur journaal*, Dutch national prime time news at 20h, Saturday August 14, 2004.

Teaching & outreach

- Teach “Quantum Optics” and “Quantum Nanophotonics” at NBI.
- Co-organizer of biennial PhD summer school on “Quantum & Nonlinear Optics”, 2006-12.
- Examiner at 8 national and international PhD defences.
- Member of steering committee for M.Sc. education in Physics at DTU 2005-2011.
- Lecturing at ”Niels Bohr Day” for the education of ~60 high school teachers, 2013.
- Lecturing at ”Folkeuniversitetet” about quantum-information technology, 2010.

10 most important publications:

P. Lodahl, S. Mahmoodian, and S. Stobbe, *Interfacing single photons and single quantum dots with photonic nanostructures*, commissioned article submitted to **Reviews of Modern Physics** (December 2013).

J. Liu, P.D. Garcia, S. Ek, N. Gregersen, T. Suhr, M. Schubert, J. Mørk, S. Stobbe, and P. Lodahl, *Random nanolasing in the Anderson localized regime*, **Nature Nanotechnology**, advanced online publication (2014).

P.D. Garcia, S. Stobbe, I. Sollner, and P. Lodahl, *Nonuniversal intensity correlations in a two-dimensional Anderson-localizing random medium*, **Physical Review Letters** 109, 253902 (2012) (5 pages).

H. Thyrrstrup, S. Smolka, L. Sapienza, and P. Lodahl, *Statistical theory of a quantum emitter strongly coupled to Anderson-localized modes*, **Physical Review Letters** 108, 113901 (2012) (5 pages).

Q. Wang, S. Stobbe, and P. Lodahl, *Mapping the local density of optical states of a photonic crystal with single quantum dots*, **Physical Review Letters** 107, 167404 (2011) (4 pages).

K.H. Madsen, S. Ates, T. Lund-Hansen, A. Löffler, S. Reitzenstein, A. Forchel, and P. Lodahl, *Observation of non-Markovian dynamics of a single quantum dot in a micropillar cavity*, **Physical Review Letters** 106, 233601 (2011) (4 pages).

M.L. Andersen, S. Stobbe, A.S. Sørensen, and P. Lodahl, *Strongly modified plasmon-matter interaction with mesoscopic quantum emitters*, **Nature Physics** 7, 215 (2011) (4 pages).

L. Sapienza, H. Thyrrstrup, S. Stobbe, P.D. Garcia, S. Smolka, and P. Lodahl, *Cavity quantum electrodynamics with Anderson-localized modes*, **Science** 327, 1352 (2010) (4 pages).

T. Lund-Hansen, S. Stobbe, B. Julsgaard, H. Thyrrstrup, T. Süner, M. Kamp, A. Forchel, and P. Lodahl, *Experimental realization of highly efficient broadband coupling of single quantum dots to a photonic crystal waveguide*, **Physical Review Letters** 101, 113903 (2008) (4 pages).

P. Lodahl, A.F. van Driel, I.S. Nikolaev, A. Irman, K. Overgaag, D. Vanmaekelbergh, and W.L. Vos, *Controlling the dynamics of spontaneous emission from quantum dots by photonic crystals*, **Nature** 430, 654 (2004) (4 pages).

Summary of work impact and importance:

The general focus of Peter Lodahl's research has been on quantum optics and quantum-information processing with special emphasis on solid-state systems. Current research topics include: quantum dot spectroscopy, control of spontaneous emission with photonic crystals, quantum plasmonics, multiple scattering and Anderson localization of light, few-photon nonlinearities, and efficient quantum-light sources for quantum-information processing.

Research highlights include:

- Demonstration of 98% coupling of single photons into a photonic-crystal waveguide (2013).
- First observation that quantum dots in plasmonic nanostructures behave fundamentally

different than their atomic counterparts providing a promising path way to enhanced light-matter interaction (2011). **The corresponding paper was published in Nature Physics and the work featured as the cover.**

- First demonstration of cavity quantum electrodynamics experiments with Anderson-localized cavities (2010). **The corresponding paper was published in Science.**
- First experimental demonstration of spatial quantum correlations induced by multiple scattering of non-classical light, which has opened a new research field of quantum optics in strongly scattering random media (2009).
- First realization of a high-efficiency single-photon source based on a quantum dot coupled to a photonic-crystal waveguide (2008).
- First experimental demonstration that the dynamics of spontaneous emission can be controlled in a photonic crystal, which was the first demonstration of the effect that founded the field of photonic band gap crystals (2004). **The corresponding paper in Nature has received >530 citations** (ISI Web of Science).