Quantum dot microcavity control of photon statistics

Snijders, H.J.

Curriculum Vitae

Henk Snijders was born on 18th December 1990 in Delft. After completing his pre-university education (VWO) at College het Loo in Voorburg, he started studying physics at the University of Leiden. In 2012 he received his Bachelor's degree with a research project on 'tuning the oxidation aperture of micropillar cavities'. Henk continued his studies for his MSc degree at the University of Leiden. In September 2015 he received his Master's degree, cum laude, after doing three research projects. In the first project, performed in the group of Prof. Jan Aarts at the University of Leiden, he investigated the possibility of generating triplet superconductivity using magnetic domains in Permalloy. In the group of Teun Klapwijk at the TU Delft he did his second research project. In the project he did simulations on the local response in a microwave impedance microscope. The third project, with the title Conductance in pilin of Geobacter sulfurreducens, was performed in the group of Dr. Bertus Beaumont at the TU Delft, and dealt with certain proteins formed by bacteria with a metal-like conductivity. On November 4 2014 Henk was awarded a Casimir PhD position, after writing a research proposal. After that, he started with a PhD in the group of Prof. Dirk Bouwmeester at the University of Leiden.

List of publications

1. M.P. Bakker, D.J. Suntrup, H. Snijders, T.-A Truong, P.M. Petroff, M.P. van Exter and D. Bouwmeester, Monitoring the formation of oxide apertures in micropillar cavities, *Appl. Phys. Lett.* **102**, 101109 (2013).

2. M.P. Bakker, D.J. Suntrup, H. Snijders, T.-A. Truong, P.M. Petroff, D. Bouwmeester and M.P. van Exter, Fine tuning of micropillar cavity modes through repetitive oxidations, *Optics Letters* **38**, 3308–3311 (2013).

3. S. Voltan, C. Cirillo, H. J. Snijders, K. Lahabi, A. García-Santiago, J. M. Hernández, C. Attanasio, and J. Aarts, Emergence of the stripe-domain phase in patterned permalloy films. *Phys. Rev. B* **94**, 094406 (2016).

4. M.P. Bakker, H. Snijders, W. Löffler, A.V. Barve, L.A. Coldren, D. Bouwmeester and M.P. van Exter, Homodyne detection of coherence and phase shift of a quantum dot in a cavity. *Optics Letters* **40**, 3173 (2015).

5. H.J. Snijders, J.A. Frey, J. Norman, M.P. Bakker, E.C. Langman, A.C. Gossard, J.E. Bowers, M.P. van Exter, D. Bouwmeester and W. Löffler, Purification of a single-photon nonlinearity. *Nature Communications* **7**, 12578 (2016).

6. H.J. Snijders, J.A. Frey, J. Norman, V.P. Post, A.C. Gossard, J.E. Bowers, M.P. van Exter, W. Löffler and D. Bouwmeester, Fiber-Coupled Cavity-QED Source of Identical Single Photons, *Physical Review Applied* **9**, 031002 (2018).

7. H.J. Snijders, J.A. Frey, J. Norman, H. Flayac, V. Savona, A.C. Gossard, J. E. Bowers, M.P. van Exter, D. Bouwmeester and W. Löffler. Observation of the Unconventional Photon Blockade. *Phys. Rev. Lett.* **121**, 043601 (2018).

8. J.A. Frey, H.J. Snijders, J. Norman, A.C. Gossard, J.E. Bowers, W. Löffler and D. Bouwmeester. Electro-optic polarization tuning of microcavities with a single quantum dot. *Optics Letters* **43**, 4280–4283 (2018).

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As a PhD student I had the pleasure to work with various Master and Bachelor students. The Master students I worked with are Marios Kounalakis, Vincent Post, David Kok, Marnix van de Stolpe and Stefano Polla. Vincent Post performed initial experiments on the fiber coupling which led to the results published in Chapter 7. David and Marnix helped formulating an extension to the semi-classical model where we incorporate multiple transitions and two orthogonally polarized cavity modes. This work is presented in Chapter 2 of this thesis. Together with Stefano and Bachelor student Daan Barsukoff Poniatowsky we carried out initial experiments to create photon cluster states. Results of these experiments are not presented in this thesis but I hope to see first experimental results before my defense. With Bachelor students Youandi van der Tang and Steven Riedijk I performed many interesting experiments on quantum dots.

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