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Researcher ID: M-6083-2014

RESEARCH INTERESTS

- Solid-state quantum optics and nanophotonics
- Non-classical light sources for quantum information science
- Quantum cryptology

EDUCATION

01/2006-02/2011 **Ph.D. in Physics,** University of Stuttgart, Germany
Topic: Resonance Fluorescence and Stimulated Light Emission from Coupled Semiconductor Quantum Dot - Cavity Systems (ISBN-10:3843901562)
Advisor: Prof. Dr. Peter Michler

09/2003-12/2005 **M.Sc. in Physics,** University of Stuttgart, Germany
Topic: Coherence Time of Single Photons from Single InGaAs/GaAs Quantum Dot Molecules
Advisor: Prof. Dr. Peter Michler

09/1999-06/2003 **B.Sc. in Physics**, İzmir Institute of Technology, Turkey
Topic: Dark Conductivity Transport in Hydrogenated Microcrystalline Silicon Thin Films and Meyer-Neldel Rule
Advisor: Prof. Dr. Mehmet Güneş

ACADEMIC EXPERIENCES

09/2015-Present **Associate Professor**, Department of Physics
İzmir Institute of Technology, Turkey

Activities:

- Solid state quantum optics with single quantum emitters in 2D based materials
- Si- and SiN-based Nanophotonics

Funded Research Projects:

1. **Title**: SiN-based Nanophotonic Light Sources for Quantum Key Distribution (PI, TUBITAK National Funding Agency **03/2017-03/2020**)
2. **Title**: Quantum Cryptology with Single Photons from Defects in Hexagonal Boron Nitride (PI, COST Action: Quantum Technologies in Space, **11/2018-11/2021**)
3. **Title**: Interaction of Single Defects in hBN with Photonic Cavities (PI, TUBITAK National Funding Agency, Turkey, **11/2018-11/2021**).

4. **Title**: Enhancement of Quantum Light Emission from Defects in hBN via Plasmonic Devices (Researcher, COST Action: Quantum Technologies in Space, **12/2018-12/2021**).
5. **Title**: Frequency Locked Single Photon Source for Quantum Information Technologies (QUBIT-FuTURE)
(Researcher, TUBITAK National Funding Agency, 11/2019 – 11/2022)

07/2013-07/2015 **Chief Researcher**, Quantum Cryptology Division
The National Research Institute of Electronics and Cryptology (UEKAE),
The Scientific and Technological Research Council of Turkey (TUBITAK).

Activities:
- Development of quantum key distribution systems.
- Fast quantum random number generators.

04/2011-06/2013 **Research Associate**, Nanofabrication Research Group
Center for Nanoscale Science and Technology (CNST), National Institute of Standards and Technology (NIST), USA,
Advisor: Dr. Kartik Srinivasan

Topic: Measuring nanoscale near-infrared quantum emitters using frequency up-conversion techniques.

Activities:
- Fabrication of wavelength-scale fiber optic probes for nanophotonic device characterization.
- Quantum frequency conversion of single photons from quantum dots
- Electro-optic modulation of single photon wavepackets: improving the performance of single photon sources.
- Frequency conversion using FWM-BS in silicon nitride waveguides

03/2009-02/2011 **Postdoctoral Research Fellow**, Quantum Photonics Research Group
Department of Photonics Engineering, Technical University of Denmark, Denmark
Advisor: Prof. Peter Lodahl

Topic: Cavity-quantum electrodynamics with semiconductor quantum dots.

Activities:
- Efficient single-photon generation from single quantum dots in photonic crystal nanocavities.
- Dynamics of single quantum dot emission in optical micro-resonators.

09/2004-02/2009 **Research Assistant,** Institute of Semiconductor Optics and Functional Interfaces (IHFG), University of Stuttgart, Germany.
Advisor: Prof. Peter Michler

Topic: Quantum optics with semiconductor quantum dots.

Activities:
- Coherent optical properties of single quantum dots in optical micro-resonators: resonance fluorescence.
- Emission characteristics, photon statistics and coherence properties of quantum dot based microcavity lasers.

PROFESSIONAL ACTIVITIES

Reviewer: Physical Review Letters, Physical Review B, Applied Physics Letter, Optics Express.

EU-Coordinated Projects: Management Committee Member for Turkey:
COST Action MP1403 - Nanoscale Quantum Optics
COST Action CA15220 - Quantum Technology in Space

AWARDS

TÜBA-GEBİP: Presidential Young Researcher Award, Turkish Academy of Sciences, Turkey 2017.

BAGEP: Young Scientist Award in Physics, The Science Academy, Turkey 2019.

JOURNAL ARTICLES

1. O. Arı, N. Polat, Ö. Çakır, **S. Ates**, "The Effect of Electron-Phonon Interactions on Spectral Properties of Single Defects in Hexagonal Boron Nitride" (**arXiv:1808.10611**).
2. I. Agha, **S. Ates**, L. Sapienza, K. Srinivasan, "Spectral broadening and shaping of nanosecond pulses: towards shaping of single photons from quantum emitters", **Optics Letters Vol. 39, Issue 19, pp. 5677- 5680 (2014).**
3. K. H. Madsen, **S. Ates**, J. Liu, A. Javadi, S. M. Albrecht, I. Yeo, S. Stobbe, and P. Lodahl, "Efficient out-coupling of high-purity single photons from a coherent quantum dot in a photonic-crystal cavity", **Physical Review B 90, 155303 (2014)**.
4. M. Davanco, C. S. Hellberg, **S. Ates**, A. Badolato, K. Srinivasan, "Multiple-time-scale blinking in InAs quantum dot single photon sources", **Physical Review B, 89, 161303(R) (2014).**
5. M. Davanco, **S. Ates**, Y. Liu, K Srinivasan, "Si3N4 optomechanical crystals in the resolved-sideband regime", **Applied Physics Letters 104, 041101 (2014) – Cover Article.**
6. I. Agha, **S. Ates**, M. Davanco, K Srinivasan, "A chip-scale, telecommunications-band frequency conversion interface for quantum emitters", **Optics Express**, **21, 21628 (2013).**
7. J. Liu, **S. Ates**, M. Lorke, J. Mork, P. Lodahl, and S. Stobbe, "A comparison between experiment and theory on on few-quantum-dot nanolasing in a photonic-crystal cavity", **Optics Express**, **21, 28507 (2013).**
8. **S. Ates**, I. Agha, A. Gulinatti, I. Rech, A. Badolato, K. Srinivasan, "Improving the performance of bright quantum dot single photon source using amplitude modulation", **Scientific Reports 3, 1397 (2013)**.
9. **S. Ates**, I. Agha, A. Gulinatti, I. Rech, M. T. Rakher, A. Badolato, K. Srinivasan, "Two-photon interference using background-free quantum frequency conversion of single photons from a semiconductor quantum dot", **Physical Review Letters, 109, 147405 (2012)**.
10. **S. Ates**, L. Sapienza, M. Davanco, A. Badolato, and K. Srinivasan, "Bright single photon emission from a quantum dot in a circular Bragg grating microcavity", **IEEE Journal of Selected Topics in Quantum Electronics, Vol. 18, No.6, 1711 (2012)**.
11. 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)**.
12. S. M. Ulrich, **S. Ates**, S. Reitzenstein, A. Löffler, A. Forchel, and P. Michler, "Dephasing of Triplet-Sideband Optical Emission of a Resonantly Driven InAs/GaAs Quantum Dot inside a Microcavity", **Physical Review Letters 106, 247402 (2011)**.

13. A. Ulhaq, **S. Ates**, S. Weiler, S. M. Ulrich, S. Reitzenstein, A. Löffler, S. Höfling, L. Worschech, A. Forchel, and P. Michler, "Linewidth broadening and emission saturation of a resonantly excited QD monitored via an off-resonant cavity mode", **Physical Review B 82, 045307 (2010)**.
14. A. Ulhaq, **S. Ates**, S. M. Ulrich, S. Reitzenstein, A. Löffler, A. Forchel and P. Michler, "Non-resonant cavity-quantum dot coupling", **Journal of Physics 210, 012058 (2010)**.
15. **S. Ates**, S. M. Ulrich, A. Ulhaq, S. Reitzenstein, A. Löffler, S. Höfling, A. Forchel, and P. Michler, "Non-resonant dot-cavity coupling and its applications in resonant quantum dot spectroscopy", **Nature Photonics 3, 724 - 728 (2009)**.
16. **S. Ates**, S. M. Ulrich, S. Reitzenstein, A. Löffler, A. Forchel, and P. Michler, "Post-Selected Indistinguishable Photons from the Resonance Fluorescence of a Single Quantum Dot in a Microcavity", **Physical Review Letters 103, 167402 (2009)**.
17. **S. Ates**, C. Gies, S. M. Ulrich, J. Wiersig, S. Reitzenstein, A. Löffler, A. Forchel, F. Jahnke, and P. Michler, "Influence of the spontaneous optical emission factor beta on the first-order coherence of a semiconductor microcavity laser", **Physical Review B 78, 155319 (2008)**.
18. **S. Ates**, C. Gies, S. M. Ulrich, J. Wiersig, S. Reitzenstein, A. Löffler, A. Forchel, F. Jahnke, and P. Michler, "Coherence length of high-beta semiconductor microcavity lasers", **Phys. stat. sol. (c), 6, 2, 568-571 (2008)**.
19. S. M. Ulrich, **S. Ates**, P. Michler, C. Gies, J. Wiersig, F. Jahnke, S. Reitzenstein, C. Hofmann, A. Löffler, and A. Forchel, "Emission Characteristics, Photon Statistics and Coherence Properties of High-Beta Semiconductor Micropillar Lasers", **Advances in Solid State Physics: Vol. 47, 3-15 (2008).**
20. S. M. Ulrich, C. Gies, **S. Ates**, J. Wiersig, S. Reitzenstein, C. Hofmann, A. Löffler, A. Forchel, F. Jahnke, and P. Michler, "Photon Statistics of Semiconductor Microcavity Lasers", **Physical Review Letters 98, 043906 (2007)**.
21. **S. Ates**, S. M. Ulrich, S. Reitzenstein, A. Löffler, A. Forchel, and P. Michler, "Coherence Properties of High-Beta Elliptical Semiconductor Micropillar Lasers", **Applied Physics Letters 90, 161111 (2007)**.

NATIONAL and INTERNATIONAL CONFERENCE PRESENTATIONS

1. E. Ozceri, O. Arı, S. Balcı, C. Kocabaş, and **S. Ateş**, "Reversible Energy Transfer Between a Single Quantum Emitter in Hexagonal Boron Nitride and Graphene", Quantum Information and Measurement (V): Quantum Technologies, Rome, Italy, 4-6 April 2019.
2. O. Arı, N. Polat, V. Fırat, Ö. Çakır, and **S. Ateş**, "The Effect of Electron-phonon Interaction on the Quantum Emission from Hexagonal Boron Nitride", Quantum Information and Measurement (V): Quantum Technologies, Rome, Italy, 4-6 April 2019.
3. E. Ozceri, O. Arı, S. Balcı, C. Kocabaş, and **S. Ateş**, "Reversible Energy Transfer Between a Single Quantum Emitter in Hexagonal Boron Nitride and Graphene", 3rd International Conference on Physics of 2D Crystals, Malta, 29 May – 2 June 2018.
4. O. Arı, Y. Oyun, N. Polat, Ö. Çakır, and **S. Ateş**, "The Effect of Electron-phonon Interaction on the Quantum Emission from Hexagonal Boron Nitride", 3rd International Conference on Physics of 2D Crystals, Malta, 29 May – 2 June 2018.
5. O. Arı, Ö. Çakır, **S. Ates**, "The Influence of Electron-Phonon Interactions on Single Photon Emission from Defects in Hexagonal Boron Nitride", Nanoscale Quantum Optics Conference, Prague, Czech Republic, 13-16 February 2018.
6. E. Ozceri, O. Arı, S. Balcı and **S. Ateş**, "Quenching of Single Photon Emission from Defects in Hexagonal Boron Nitride", Quantum Optics and Information Meeting, Turkey, İstanbul, 1-2 February 2018.
7. **S. Ates** (**Invited**), "Quantum Optics with Defects in Hexagonal Boron Nitride", Quantum Optics and Information Meeting, Turkey, İstanbul, 1-2 February 2018.

8. Z. Çetin, N. Polat, **S. Ateş**, "Design of SiN based Nanophotonic Devices for Photon-Pair Generation", Quantum Optics and Information Meeting, Turkey, İstanbul, 1-2 February 2018.
9. O. Arı, Ö. Çakır, **S. Ates**, "Phonon induced broadening and dephasing of the quantum emission from the defect centers in hexagonal boron nitride", Quantum Optics and Information Meeting, Turkey, İstanbul, 1-2 February 2018.
10. Y. Oyun, E. Özçeri, N. Polat, O. Arı, Ö. Çakır and **S. Ateş**, "Optical Properties of Defects in Hexagonal Boron Nitride", 13. Nanoscience & Nanotechnology Conference (NanoTR-13), Antalya 22-25 October 2017.
11. O. Arı, Ö. Çakır, **S. Ates**, "The Effect of Electron-Phonon Interaction on the Quantum Emission from Hexagonal Boron Nitride", 19. National Optics, Electro-Optics and Photonics Workshop, İstanbul, 29 September 2017.
12. **S. Ateş** (**Invited**), "Optical Properties of Single Defects in Multilayer hBN", 22. Condensed Matter Physics Meeting, Ankara, Turkey, 16 December 2016.
13. V. Fırat, N. Polat, A. Yanılmaz, O. Arı, Y. Selamet, **S. Ates**, "Visible Photon Emission from Defect Centers in Multilayer Hexagonal Boron Nitride", 18. National Optics, Electro-Optics and Photonics Workshop, Ankara, 23 September, 2016.
14. V. Fırat, N. Polat, A. Yanılmaz, O. Arı, Y. Selamet, **S. Ates**, "Efficient Generation and Manipulation of Single Photons from Single Quantum Emitters", Science and Applications of Thin Films Conference (SATF 2016), Çeşme/İzmir, September, 2016.
15. M. Davanco, **S. Ates,** Y. Liu, K. Srinivasan, "Electromagnetically Induced Transparency in Si3N4 nanobeam optomechanical crystals", Quantum Electronics and Laser Science Conference (CLEO), San Jose, California, USA, May, 2014.
16. K. Srinivasan, I. Agha, **S. Ates,** M. Davanco, Y. Liu, "New Applications and Devices for Quantum Frequency Conversion", Quantum Electronics and Laser Science Conference (CLEO), San Jose, California, USA, May, 2014.
17. I. Agha, **S. Ates,** L. Sapienza, K. Srinivasan, "Single-photon-compatible spectral broadening and shaping via nonlinear mixing and phase modulation", Quantum Electronics and Laser Science Conference (CLEO), San Jose, California, USA, May, 2014.
18. **S. Ates**, I. Agha, M. Davanco, K. Srinivasan, "Frequency conversion interface to the telecom band via four-wave mixing Bragg scattering in a silicon nitride chip", Frontiers in Optics, Florida, USA, October 2013.
19. K. Srinivasan, **S. Ates**, I. Agha, M. Davanco, Y. Liu, M. Rakher, "Nanophotonics and Quantum Frequency Conversion"(Invited), Frontiers in Optics, Florida, USA, October 2013 .
20. **S Ates**, I Agha, A Gulinatti, I Rech, MT Rakher, A Badolato, K Srinivasan, "Erasing spectral distinguishability in quantum dot based single photon sources using quantum frequency conversion", Quantum Electronics and Laser Science Conference (CLEO), San Jose, California, USA, May 6-11, 2013.
21. I Agha, **S Ates**, A Gulinatti, I Rech, A Badolato, K Srinivasan "Temporal filtering via amplitude modulation to improve quantum dot single photon sources", Quantum Electronics and Laser Science Conference (CLEO), San Jose, California, USA, May 6-11, 2013.
22. **S. Ates**, I. Agha, A. Badolato, and K. Srinivasan, "Low-noise quantum frequency conversion of single photons from a single quantum dot", Frontiers in Optics (FIO), Rochester, USA, October 2012.
23. **S. Ates**, I. Agha, A. Badolato, and K. Srinivasan, "Quantum-frequency conversion of single photons from semiconductor quantum dots", International Workshop on Nonlinear Optics and Excitation Kinetics in Semiconductors (NOEKS-11), Stuttgart, Germany, September 2012.
24. **S. Ates**, L. Sapienza, M. Davanco, A. Badolato, and K. Srinivasan, "Efficient single photon generation from semiconductor quantum dots in a circular dielectric grating", International

Workshop on Nonlinear Optics and Excitation Kinetics in Semiconductors (NOEKS-11), Stuttgart, Germany, September 2012.

25. **S. Ates**, L. Sapienza, M. Davanco, A. Badolato, and K. Srinivasan, "Bright single photon emission from a quantum dot in a circular dielectric grating", Quantum Electronics and Laser Science Conference (CLEO), San Jose, California, USA, May 6-11, 2012.
26. K. H. Madsen, **S. Ates**, T. Lund-Hansen, A. Löffler, S. Reitzenstein, A. Forchel, and P. Lodahl, "Non-Markovian spontaneous emission from a single quantum dot", Frontiers in Optics (FIO), San Jose, California, USA, October 16-21, 2011.
27. Jin Liu, **S. Ates**, S. Stobbe, M. Lorke, and P. Lodahl "Few-quantum-dot lasing in photonic crystal nanocavities", European Conference on Lasers and Electro-Optics (CLEO-Europe), Munich, Germany, May 22-26, 2011.
28. 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", European Conference on Lasers and Electro-Optics (CLEO-Europe), Munich, Germany, May 22-26, 2011.
29. S. M. Ulrich, **S. Ates**, S. Reitzenstein, A. Löffler, A. Forchel, and P. Michler, Spectrally tunable mollow triplet emission from a coherently excited quantum dot in a microcavity", (Invited, Oral) International Workshop on Nonlinear Optics and Excitation Kinetics in Semiconductors (NOEKS-10), Paderborn, Germany, August 16-19 2010.
30. K. H. Madsen, **S. Ates**, S. Reitzenstein, A Forchel, and P. Lodahl, "Cavity quantum electrodynamics of a quantum dot in a micropillar cavity: comparison between experiment and theory", (Invited, Oral) International Workshop on Nonlinear Optics and Excitation Kinetics in Semiconductors (NOEKS-10), Paderborn, Germany, August 16-19 2010.
31. **S. Ates**, S. Stobbe, and P. Lodahl, "Indistinguishable photon generation from a single quantum dot in a photonic crystal nanocavity", (Poster) International Workshop on Nonlinear Optics and Excitation Kinetics in Semiconductors (NOEKS-10), Paderborn, Germany, August 16-19 2010.
32. S.M. Ulrich, **S. Ates**, S. Reitzenstein, A. Löffler, S. Hofling, A. Forchel, and P.Michler, "Resonance fluorescence of a single QD in a microcavity: generation of indistinguishable photons and detailed monitoringof s-shell characteristics via non- resonant dot-cavity coupling", (Invited, Oral) Third Workshop on Positioning of single nanostructures Single quantum devices, Lauterbad-Freudenstadt, Germany, December 2009.
33. **S. Ates**, A Ulhaq, S. M. Ulrich, T. Lund-Hansen, S. Reitzenstein, A Forchel, P. Lodahl, and P. Michler, "Coherent optical spectroscopy of a single quantum dot (non)-resonantly coupled to a high-Q microcavity", (Invited, Oral) Electronic/Optical Coherence in Low Dimensional Semiconductors and Atomic Gases, Turunc, Turkey, September 26-29, 2009.
34. A. Ulhaq, **S. Ates**, S.M. Ulrich, S. Reitzenstein, A. Löffler, A. Forchel, and P.Michler, "Non-resonant cavity quantum dot coupling", International Conference on Optics of Excitons in Confined Systems (OECS 11), Madrid, Spain, September 7-11, 2009.
35. **S. Ates**, SM Ulrich, S. Reitzenstein, A Löffler, A Forchel, and P Michler, "Two-photon interference from the resonance fluorescence of a single quantum dot in a microcavity", The 14th International Conference on Modulated Semiconductor structures, Kobe, Japan, June 14-19, 2009.
36. **S. Ates**, SM Ulrich, S. Reitzenstein, A Löffler, A Forchel, and P Michler, "Two-photon interference from the resonance fluorescence of a single quantum dot in a microcavity", The European Conference on Lasers and Electro-Optics, Munich, Germany, June 14-19, 2009.
37. **S. Ates**, S. M. Ulrich, S. Reitzenstein, A. Löffler, A. Forchel and P. Michler, "Non-Classical Light Generation from Semiconductor Quantum Dots in Micropillar Cavities", (Invited) Nanoscience and Nanotechnology Conference (NanoTR-IV) Istanbul, Turkey, June 9-13 2008.

38. **S. Ates**, S. M. Ulrich, P. Michler, C. Gies, J. Wiersig, F. Jahnke, S. Reitzenstein, C. Hofmann, A. Löffler, and A. Forchel, "Coherence Length of High-Beta Semiconductor Microcavity Lasers", (Poster) International Workshop on Nonlinear Optics and Excitation Kinetics in Semiconductors (NOEKS-9), Klink/Muritz, Germany, May 26-29 2008.
39. **S. Ates**, S.M. Ulrich, S. Reitzenstein, A. Löffler, A. Forchel, and P. Michler, "Coherence Properties of High-Beta Semiconductor Micropillar Lasers", Lasers and Electro-Optics, Conference, Munich, Germany, June 17-22, 2007.
40. **S. Ates**, S. M. Ulrich, S. Reitzenstein, A. Löffler, A. Forchel and P. Michler, "Coherence properties of high-beta semiconductor micropillar lasers", Nanoscience and Nanotechnology Conference (NanoTR-III) Istanbul, Turkey, June 11-14 2007.
41. S. M. Ulrich, C. Gies, **S. Ates**, J. Wiersig, S. Reitzenstein, C. Hofmann, A. Löffler, A. Forchel, F. Jahnke, P. Michler, "Photon emission statistics and coherence properties of high-beta semiconductor microcavity lasers", Quantum Electronics and Laser Science Conference, Baltimore, MD, USA, May 7-11, 2007.
42. P. Michler, G. Beirne, C. Hermannstadter, S. M. Ulrich, **S. Ates**, L. Wang, A. Rastelli, O. G. Schmidt, C. Gies, J. Wiersing, F. Jahnke, S. Reitzenstein, C. Hoffmann, A. Löffler, and A. Forchel, "Quantum optical studies on laterally coupled quantum dots and pillar microcavities" (Invited) DPG-Conference 2007, Regensburg, Germany, March 26-30 2007.
43. **S. Ates**, S. M. Ulrich, S. Reitzenstein, A. Löffler, A. Forchel, and P. Michler, "Coherence Properties of high-beta Semiconductor Micropillar Lasers", DPG-Conference 2007, Regensburg, Germany, March 26-30 2007.