

Resonant Nanophotonics, A. F. Koenderink (2017-2022)

Biography



Femius Koenderink (1976) studied Experimental Physics (MSc 1998, cum laude) and Mathematics (MSc 1999, cum laude) at Utrecht University. He did his PhD studies in the field of light emission and scattering in 3D photonic crystals at the University of Amsterdam in the group of Ad Lagendijk and Willem Vos (2003, cum laude). From 2003-2005 he worked as postdoc in the Nano-Optics group of Vahid Sandoghdar at ETH Zürich. After a VENI postdoctoral fellowship in the team of Albert Polman, at AMOLF he became group leader of the “Resonant Nanophotonics” group in 2008, and Department Head Nanophotonics in 2016. Since 2012 he is also affiliated as professor at the Institute of Physics, University of Amsterdam. He received the NWO Veni, Vidi and Vici personal talent awards, as well as the ACS

Photonics Young Investigator Lectureship (2018) and was elected member of DJA (The Young Academy of the Royal Dutch Academy of Sciences (KNAW)) in 2012, and Optica Fellow in 2022.

Femius Koenderink is fascinated by the physics of subwavelength strongly scattering resonant structures to control propagation, emission, detection, and amplification of light. His work sits at the interface of plasmonics, metasurfaces, nanoscopy of single nano-objects and the field of light-matter interaction at the level of single molecules and single photon sources. His work includes both theory and experiments, and his group develops state of the art optical techniques including superresolution mapping of local density of states, polarization and phase-resolved Fourier microscopy technique to quantify far-field radiation patterns in emission and scattering from single nano-objects, and the realization of high-Q hybrid plasmonic-photonic resonator systems. Alongside his fundamental research interests he has longstanding industrial collaborations in the domains of solid-state lighting (with Philips, Signify, Lumileds), and scatterometry for wafer metrology (with ARCNL and ASML)

Group output

Peer reviewed Publications 2017-2022

2017

1. Y. Chen, Y. Zhang and A.F. Koenderink, *General point dipole theory for periodic metasurfaces : magnetoelectric scattering lattices coupled to planar photonic structures*, Opt. Express **25**, 21358–21378 (2017). **Gold OA**
2. S. Brittman, S.Z. Oener, K. Guo, H. Abolins, A.F. Koenderink and E.C. Garnett, *Controlling crystallization to imprint nanophotonic structures into halide perovskites using soft lithography*, J. Mater. Chem. C **5**, 8301-8307 (2017). **Green OA**
3. K. Guo, A. Antoncicchi, X. Zheng, M. Sallam, E.A. Soliman, G.A.E. Vandenbosch, V.V. Moshchalkov and A.F. Koenderink, *Dendritic optical antennas: scattering properties and fluorescence enhancement*, Sci. Rep. **7**, 6223: 1-10 (2017). **Gold OA**
4. L. Langguth, A. Szuba, S. Mann, E.C. Garnett, G.H. Koenderink and A.F. Koenderink, *Nano-antenna enhanced two-focus fluorescence correlation spectroscopy*, Sci. Rep. **7**, 5985: 1-9 (2017). **Gold OA**

5. K. Guo, M. Du, C.I. Osorio and A.F. Koenderink, *Broadband light scattering and photoluminescence enhancement from plasmonic Vogel's golden spirals*, *Laser & Photonics Rev.* **11**, 1600235: 1-10 (2017). **Green OA**
6. A.F. Koenderink, *Single-photon nanoantennas*, *ACS Photonics* **4**, 710–722 (2017). **Hybrid OA**
7. A.H. Schokker, F. van Riggelen, Y. Hadad, A. Alù and A.F. Koenderink, *Systematic study of the hybrid plasmonic-photonic band structure underlying lasing action of diffractive plasmon particle lattices*, *Phys. Rev. B* **95**, 085409: 1-14 (2017). **Green OA**

2018

1. E. Johlin, S. Mann, S. Kasture, A. F. Koenderink and E. C. Garnett, *Broadband highly directive 3D nanophotonic lenses*, *Nat. Commun.* **9**, 4742:1-8 (2018). **Gold OA**
2. R. Röhrich, C. Hoekmeijer, C. I. Osorio, and A. F. Koenderink, *Quantifying single plasmonic nanostructure far -fields with interferometric and polarimetric k-space microscopy*, *Light: Sci. Appl.* **7**, 65:1–11 (2018). **Gold OA**
3. H. M. Doeleman, F. Monticone, W. den Hollander, A. Alù and A. F. Koenderink, *Experimental observation of a polarization vortex at an optical bound state in the continuum*, *Nat. Photonics* **12**, 397–401 (2018). **Green OA**
4. F. Ruesink, H. M. Doeleman, E. Verhagen and A. F. Koenderink, *Controlling nanoantenna polarizability through backaction via a single cavity mode*, *Phys. Rev. Lett.* **120**, 206101: 1–6 (2018). **Green OA**
5. F. Monticone, H. M. Doeleman, W. den Hollander, A. F. Koenderink and A. Alù, *Trapping Light in Plain Sight: Embedded Photonic Eigenstates in Zero-Index Metamaterials*, *Laser Photonics Rev.* **12**, 1700220:1–11 (2018). **Green OA**
6. B. Van Dam, C. I. Osorio, M. Hink, R. Muller, A. F. Koenderink, and K. Dohnalova, *High internal emission efficiency of silicon nanoparticles emitting in the visible range*, *ACS Photonics* **5**, 2129–2136 (2018). **Gold OA**
7. S. Kasture, *Scalable approach to generation of large symmetric Dicke states*, *Phys. Rev. A* **97**, 043862: 1–6 (2018). **Green OA**
8. S. Kasture, *Designing optical circuits using plasmonic beam splitters*, *Opt. Lett.* **43**, 2547–2550 (2018). **Green OA**

2019

1. K.G. Cognée, H.M. Doeleman, P. Lalanne and A.F. Koenderink, *Cooperative Interactions between Nanoantennas in a High Q Cavity for Unidirectional Light Sources*, *Light: Sci. Appl.* **8**, 115: 1-14, (2019). **Gold OA**
2. A. Cordaro, H. Kwong, D.L. Sounas, A.F. Koenderink, A. Alù and A. Polman, *High-index dielectric metasurfaces performing mathematical operations*, *Nano Lett.* **19**, 8418-8423, (2019). **Hybrid OA**
3. A. Berkhout and A.F. Koenderink, *Perfect Absorption and Phase Singularities in Plasmon Antenna Array Etalons*, *ACS Photonics* **6**, 2917-2925, (2019). **Hybrid OA**
4. R. Kolkowski and A.F. Koenderink, *Lattice Resonances in Optical Metasurfaces With Gain and Loss*, *Proc. IEEE [special issue Active Nanophotonics]* **108**, 1-24, (2019). **Green OA**
5. A. Vaskin, R. Kolkowski, A.F. Koenderink and I. Staude, *Light Emitting Metasurfaces*, *Nanophotonics* **8**, 1151–1198, (2019). **Gold OA**
6. A.F. Koenderink, *Plasmon Nanocavity Array Lasers: Cooperating over Losses and Competing for Gain*, *ACS Nano* **13**, 7377-7382, (2019). **Hybrid OA**
8. K. Guo, S. Kasture and A.F. Koenderink, *Plasmon antenna array "patchwork" lasers - towards low etendue*, speckle free light sources, *OSA Continuum* **2**, 1982-1997, (2019). **Gold OA**
9. I.M. Palstra, H.M. Doeleman and A.F. Koenderink, *Hybrid Cavity-Antenna Systems for Quantum Optics Outside the Cryostat?*, *Nanophotonics* **8**, 1513-1531, (2019). **Gold OA**

10. K.G. Cognée, W. Yan, F. La China, D. Balestri, F. Intonti, M. Gurioli, A.F. Koenderink and P. Lalanne, *Mapping Complex Mode Volumes with Cavity Perturbation Theory*, *Optica* **6**, 269-273, (2019). **Gold OA**
11. K. Guo and A.F. Koenderink, *Spatial Intensity Distribution in Plasmonic Particle Array Lasers*, *Phys. Rev. Appl.* **11**, 024025: 1-12, (2019). **Green OA**

2020

1. C.-C. Huang, Y. Tang, M. van der Laan, J. van de Groep, A.F. Koenderink and K. Dohnalová, *Band-Gap Tunability in Partially Amorphous Silicon Nanoparticles Using Single-Dot Correlative Microscopy*, *ACS Appl. Nano Mater.* **4**, 288-296, (2020) **Hybrid OA**.
2. R. Röhrich and A.F. Koenderink, *Double moiré localized plasmon structured illumination microscopy*, *Nanophotonics* **10**, 1107-1121 (2020) **Gold OA**.
3. N.J. Schilder, T.A.W. Wolterink, C. Mennes, R. Röhrich and A.F. Koenderink, *Phase-retrieval Fourier microscopy of partially temporally coherent nanoantenna radiation patterns*, *Opt. Express* **28**, 37844-37859 (2020) **Gold OA**.
4. R.D. Buijs, N.J. Schilder, T.A.W. Wolterink, G. Gerini, E. Verhagen and A.F. Koenderink, *Super-Resolution without Imaging: Library-Based Approaches Using Near-to-Far-Field Transduction by a Nanophotonic Structure*, *ACS Photonics* **7**, 3246-3256 (2020) **Hybrid OA**.
5. K.G. Cognée, H.M. Doleman, P. Lalanne and A.F. Koenderink, *Generation of pure OAM beams with a single state of polarization by antenna-decorated microdisk resonators*, *ACS Photonics* **7**, 3049-3060 (2020) **Hybrid OA**.
6. E. Marino, A. Sciortino, A. Berkhout, K.E. MacArthur, M. Heggen, T. Gregorkiewicz, T.E. Kodger, A. Capretti, C.B. Murray, A.F. Koenderink, F. Messina and P. Schall, *Simultaneous Photonic and Excitonic Coupling in Spherical Quantum Dot Supercrystals*, *ACS Nano* **14**, 13806-13815 (2020) **Hybrid OA**.
7. A. Berkhout, T.A.W. Wolterink and A.F. Koenderink, *Strong coupling to generate complex birefringence - metasurface in the middle etalons*, *ACS Photonics* **7**, 2799-2806 (2020) **Hybrid OA**.
8. H.M. Doleman, C.D. Dieleman, C. Mennes, B. Ehrler and A.F. Koenderink, *Observation of Cooperative Purcell Enhancements in Antenna-Cavity Hybrids*, *ACS Nano* **14**, 12027-12036 (2020) **Hybrid OA**.
9. R. Röhrich, G. Oliveri, S. Kovaivos, T.V. Tenner, A.J. den Boef, J.T.B. Overvelde and A.F. Koenderink, *Uncertainty estimation and design optimization of 2D diffraction-based overlay metrology targets*, *ACS Photonics* **7**, 2765-2777 (2020) **Hybrid OA**.
10. A. Xomalis, R. Chikkaraddy, E. Oksenberg, I. Shlesinger, J. Huang, E.C. Garnett, A.F. Koenderink and J.J. Baumberg, *Controlling Optically Driven Atomic Migration Using Crystal-Facet Control in Plasmonic Nanocavities*, *ACS Nano* **14**, 10562-10568 (2020) **Hybrid OA**.
11. R. Kolkowski and A.F. Koenderink, *Gain-induced scattering anomalies of diffractive metasurfaces*, *Nanophotonics* **9**, 4273-4285 (2020) **Gold OA**.
12. A. Berkhout and A.F. Koenderink, *A simple transfer-matrix model for metasurface multilayer systems*, *Nanophotonics* **9**, 3985-4007 (2020) **Gold OA**.
13. L. Helmbrecht, M. Tan, R. Röhrich, M.H. Bistervels, B.O. Kessels, A.F. Koenderink, B. Kahr and W.L. Noorduin, *Directed Emission from Self-Assembled Microhelices*, *Adv. Funct. Mater.* **30**, 1908218: 1-5 (2020) **Green OA**.
15. Z. Geng, K.J.H. Peters, A.A.P. Trichet, K. Malmir, R. Kolkowski, J.M. Smith and S.R.K. Rodriguez, *Universal Scaling in the Dynamic Hysteresis, and Non-Markovian Dynamics, of a Tunable Optical Cavity*, *Phys.Rev.Lett.* **124**, 153603: 1-7 (2020) **Hybrid OA**

2021

1. I. Shlesinger, K. Cognée, E. Verhagen, and A. F. Koenderink, *Integrated Molecular Optomechanics with Hybrid Dielectric-Metallic Resonators*, *ACS Photonics* **8**, 3506-3516 (2021). **Hybrid OA**

2. R. D. Buijs, T. A. W. Wolterink, G. Gerini, A. F. Koenderink, and E. Verhagen, *Information Advantage from Polarization-Multiplexed Readout of Nanophotonic Scattering Overlay Sensors*, *Optics Express* **29**, 42900–42910, (2021). **Gold OA**
3. E. Oksenberg, I. Shlesinger, A. Xomalis, A. Baldi, J. J. Baumberg, A. F. Koenderink and E. C. Garnett, *Energy-resolved plasmonic chemistry in individual nanoreactors*, *Nature Nanotechnol.* **16**, 1378-1385 (2021). **Green OA**
4. M. van der Laan, de Weerd C., L. Poirier, O. van de Water, D. Poonia, L. Gomez, S. Kinge, L. D. A. Siebbeles, A. F. Koenderink, T. G. Gregorkiewicz, and P. Schall, *Photon Recycling in CsPbBr₃ All-Inorganic Perovskite Nanocrystals*, *ACS Photonics* **8**, 3201-3208 (2021). **Hybrid OA**
5. A. I. Barreda, M. Zapata-Herrera, I. Palstra, L. Mercadé, J. Aizpurua, A. F. Koenderink, and A. Martínez, *Hybrid Photonic-Plasmonic Cavities Based on the Nanoparticle-on-a-Mirror Configuration*, *OSA Photonics Research* **9**, 2398-2419 (2021). **Hybrid OA**
6. T. A. W. Wolterink, R. D. Buijs, G. Gerini, E. Verhagen, and A. F. Koenderink, *Calibration-Based Overlay Sensing with Minimal-Footprint Targets*, *Appl. Phys. Lett.* **119**, 111104 (2021). **Green OA**
7. R. Kolkowski, S. Kovaivos, and A. F. Koenderink, *Pseudochirality at Exceptional Rings of Optical Metasurfaces*, *Phys. Rev. Res.* **3**, 023185 (2021). **Gold OA**
8. I. M. Palstra and A. F. Koenderink, *A Python Toolbox for Unbiased Statistical Analysis of Fluorescence Intermittency of Multi-Level Emitters*, *J. Phys. Chem. C* **125**, 12050–12060, (2021). **Hybrid OA**
9. I. M. Palstra, I. M. de Buy Wenniger, B. K. Patra, E. C. Garnett, and A. F. Koenderink, *Intermittency of CsPbBr₃ Perovskite Quantum Dots Analyzed by an Unbiased Statistical Analysis*, *J. Phys. Chem. C* **125**, 12061–12072, (2021). **Hybrid OA**
10. R. D. Buijs, T. A. W. Wolterink, G. Gerini, E. Verhagen, and A. F. Koenderink, *Programming Metasurface near-Fields for Nano-Optical Sensing*, *Adv. Opt. Mater.* **9** 2100435, (2021). **Green OA**
11. R. Röhrich, A. F. Koenderink, S. Witte, and L. Loetgerink, *Spatial Coherence Control and Analysis via Micromirror-Based Mixed-State Ptychography*, *New J. Phys* **23**, 053016, (2021). **Gold OA**
12. T. A. W. Wolterink, R. D. Buijs, G. Gerini, A. F. Koenderink, and E. Verhagen, *Localizing Nanoscale Objects Using Nanophotonic near-Field Transducers*, *Nanophotonics* **10**, 1723–1732, (2021). **Gold OA**
13. C.-C. Huang, Y. Tang, M. van der Laan, J. van de Groep, A. F. Koenderink, and K. Dohnalova, *Direct Evaluation of Bandgap Tunability in Partly Amorphous Silicon Nanoparticles by Single-Dot Correlative Optical and Scanning Probe Microscopy*, *ACS Appl. Nano Mater.* **4**, 288–296, (2021). **Hybrid OA**
14. R. Röhrich and A. F. Koenderink, *Double Moiré Localized Plasmon Structured Illumination Microscopy*, *Nanophotonics* **10**, 1107–1121, (2021). **Gold OA**
15. C. Messinis, T. T. M. Van Schaijk, N. Pandey, A. Koolen, I. Shlesinger, X. Liu, S. Witte, J. F. de Boer, A. Den Boef, *Aberration calibration and correction with nano-scatterers in digital holographic microscopy for semiconductor metrology*, *Optics Express*, **29**, 38237-38256, (2021). **Gold OA**

2022

1. I. Shlesinger, I. M. Palstra and A. F. Koenderink, *Integrated sideband-resolved SERS with a dimer on a nanobeam hybrid*, *Phys. Rev. Lett.* **130**, (1), 016901: 1-6 (2022) **Green OA**
2. L. A. Muscarella, C. E. A. Cordaro, G. Krause, D. Pal, G. Grimaldi, L. S. D. Antony, D. Langhorst, A. Callies, B. Bläsi, O. Höhn, A. F. Koenderink, A. Polman and B. Ehrler, *Nanopatterning of Perovskite Thin Films for Enhanced and Directional Light Emission*, *ACS Appl. Mater. Interfaces* **14**, (33), 38067-38076 (2022) **Hybrid OA**
3. S. D. C. Roscam Abbing, R. Kolkowski, Z.-Y. Zhang, F. Campi, L. Lötgering, A. F. Koenderink and P. M. Kraus, *Extreme-Ultraviolet Shaping and Imaging by High-Harmonic Generation from Nanostructured Silica*, *Phys. Rev. Lett.* **128**, (22), 223902: 1-7 (2022) **Green OA**
4. N. Tavakoli, R. Spalding, A. Lambertz, P. Koppejan, G. Gkantounis, C. Wan, R. Röhrich, E. Kontoleta, A. F. Koenderink, R. Sapienza, M. Florescu and E. Alarcón-Lladó, *Over 65% Sunlight*

Absorption in a 1 μm Si Slab with Hyperuniform Texture, ACS Photonics **9**, (4), 1206-1217 (2022) **Hybrid OA**

5. A.F. Koenderink, R. Tsukanov, J. Enderlein, I. Izeddin and V. Krachmalnicoff, *Super-resolution imaging: When biophysics meets nanophotonics*, Nanophotonics **11**, (2), 169-202 (2022) **Gold OA**
6. E. Oksenberg, I. Shlesinger, G. Tek, A.F. Koenderink and E.C. Garnett, *Complementary Surface-Enhanced Raman Scattering (SERS) and IR Absorption Spectroscopy (SEIRAS) with Nanorods-on-a-Mirror*, Adv. Funct. Mater., 2211154: 1-10 (2022) **Hybrid OA**

Contributions to scientific books (chapters or entire book) 2017-2022

2017

1. Y. Hadad, A. H. Schokker, F. van Riggelen, and A. F. Koenderink, *Plasmon Particle Array Lasers*. In *Quantum Plasmonics*; S. I. Bozhevolnyi, L. Martin-Moreno, and F. J. Garcia-Vidal, Eds.; Springer Series in Solid-State Sciences; Springer, (2017); Vol. 185, pp. 165–190.

PhD theses 2017-2022

2017

1. M. Cotrufo, *Light-matter interaction in nanophotonic structures*, Eindhoven University of Technology, 24-1-2017 (2nd promotor).
2. F. Ruesink, *Manipulating light with ring resonators coupled to antennas and mechanical motion*, Eindhoven University of Technology, 23-11-2017 (2nd promotor)

2018

1. K. Guo, *Shaping Light Emission for Solid State Lighting with Plasmon Nanoantennas* PhD thesis, University of Amsterdam,

2019

1. H.M Doeleman, *Hybrid Resonators for Light Trapping and Emission Control*, University of Amsterdam, January 18, 2019.

2020

1. R. Röhrich, *Unconventional metrology: Merging nanophotonics with computational imaging*, University of Amsterdam, 2020-12-11, OA.
2. A. Berkhout, *Planar hybrid plasmonic-photonic resonators: an interferometric investigation*, University of Amsterdam, 2020-11-13, OA.
3. G.R. La Gala, *Glancing at tiny vibrations: backaction evading measurements of mechanical motion close to the quantum regime*, Eindhoven University of Technology, 2020-07-01, OA (2nd promotor).
4. K.G. Cognée, *Hybridization of open photonic resonators*, University of Amsterdam and University of Bordeaux (Joint doctorate), 2020-01-28, OA.

2021

1. C.-C. Huang, *Correlative Optical and Scanning Probe Microscopy of Silicon Quantum Dots*, University of Amsterdam, 21/01/2021 (main supervisor: Dr. K. Newell).
2. R.D. Buijs, *Nano-optical sensing and metrology through near- to far-field transduction*, Eindhoven University of Technology, 06/07/2021. Open Access

3. I.M. Palstra, *An investigation towards single-emitter hybrid photonic devices*, University of Amsterdam, 27/09/2021. Open Access

2022

1. Z. Geng, *Strong light-matter interactions and nonlinear dynamics in coherently driven optical resonators*, University of Amsterdam, 2022-06-02 OA (main supervisor: Dr. S.R.K. Rodriguez)

Masters and Bachelors theses 2017-2022

2017

1. MSc thesis; C. Hoekmeijer, *Full far-field retrieval using off-axis holography*, UvA/VU MSc programme.
2. MSc thesis; N. Veenhoven, *Nanodrip – Electrohydrodynamic ink-jet printing on the s*, UvA/VU MSc programme.

2018

1. MSc thesis; S. Roscam-Abbing, *Characterizing the length of a femtosecond pulse at a microscopic sample plane*, Utrecht University MSc programme.
2. MSc thesis; I. Maillette de Buy Wenniger, *Emission Dynamics of Halide Perovskite Quantum Dots*, UvA/VU MSc programme.

2019

1. MSc thesis; T. Kaandorp, *Tailoring photonic response for enhanced Raman spectroscopy*, UvA/VU MSc programme.
2. BSc thesis; T. Esselink, *Near unity collection efficiency of light from single photon sources in planar antenna structure*, The Hague University of Applied Sciences (HBO).

2020

1. MSc thesis; B. Ferrando, *An optical microcavity and nanoantenna hybrid resonator*, MSc thesis University of Amsterdam (April 2020).
2. MSc thesis; S. Kovaivos, *Spatially programming gain in plasmonic lattices and metasurfaces*, UvA/VU MSc programme.

Invited lectures at international conferences and meetings

2017

1. A.F. Koenderink, *Light-matter interaction in hybrid plasmonic-photonic resonators*, APS March Meeting 2017, New Orleans (Louisiana), USA, March 13-17, 2017.
2. A.F. Koenderink, *Hybrid photonic-plasmonic resonances to control spontaneous and stimulated emission*, CLEO/Europe-EQEC 2017 the Conference on Lasers and Electro-Optics/Europe and the European Quantum Electronics Conference, Munich, Germany, June 25-29, 2017.
3. A.F. Koenderink, *Resolving nano-antenna physics through amplitude, polarization and phase of far field angular distributions of light*, 19th International Conference on Transparent Optical Networks ICTON 2017 and 9th Sub-Wavelength Photonics Conference SWP 2017, Girona, Spain, July 2-6, 2017.
4. A. F. Koenderink, *Quantum plasmonics – hybrid plasmonic/photonic resonators*, Frontiers in Quantum Nanophotonics, Monte Verita / Ascona, Switzerland, August 20-25, 2017.

5. A.F. Koenderink, *Polarimetric and Interferometric measurement of Orbital Angular Momentum imparted by single nano-antennas*, Medi-Nano 9, 9th Mediterranean Conference on Nanophotonics, Amalfi, Italy, Sep. 3-7, 2017.
6. A. F. Koenderink, *Phase- and polarization mapping in angle-resolved cathodoluminescence imaging*, EBSN 2017, 2nd International Workshop on Electron Beam Spectroscopy for Nanophotonics, Sitges/Barcelona, Spain, Oct. 25-27, 2017.

2018

1. A. F. Koenderink, *High-Q plasmonics in hybrid resonators*, SPIE Photonics Europe 2018, Strasbourg, France, April 22-26, 2018
2. A. F. Koenderink, *Plasmonic confinement at microcavity Q?*, Prospects of Plasmonics for Quantum Technologies, Aspen/Goteborg, Sweden, June 25-27, 2018.
3. A. F. Koenderink, *High-Q plasmonic resonances in hybrid nanophotonic structures*, SPIE Optics + Photonics 2018, San Diego, USA, August 19-23, 2018.
4. A. F. Koenderink, *High quality plasmonic light sources*, NANOP 2018 Nanophotonics and Micro/Nano Optics International Conference 2018, Rome, Italy, October 3-5, 2018. (Keynote)

2019

1. A.F. Koenderink, *Phase and polarization-resolved k-space imaging, applied to embedded eigenstates and spin-orbit interactions*, Nanometa 2019, Seefeld, Austria, January 3, 2019 (invited talk).
2. A.F. Koenderink, *Probing high-Q modes with plasmonic confinement in nanoantenna-cavity hybrids with quantum dots*, Quantum Nanophotonics, Benasque, Spain, March 17-23, 2019. (invited talk)
3. R. Kolkowski, *Time dependence of the local optical fields in plasmonic nanoantennas probed by nonlinear emission*, International Symposium, 20th anniversary of LPQM - Institut d'Alembert – Chemla Auditorium, ENS Paris Saclay, Cachan, France, April 12, 2019. (invited talk)
4. A.F. Koenderink, *Achieving Light-Matter Interaction at Microcavity Q yet Plasmonic Mode Volumes*, 2019 Conference on Lasers and Electro-Optics (CLEO), San Jose (CA), USA, May 5-10, 2019. (invited talk)
5. A.F. Koenderink, *Resonant Nanophotonics and Plasmonic confinement at high Q - can plasmonic-photonic resonators reach strong coupling?*, AMOLF International Nanophotonics summerschool, Amsterdam, the Netherlands, June 17-21, 2019. (invited tutorial and highlight talk)
6. R. Kolkowski and A.F. Koenderink, *Shaping Light Emission by Plasmon Antenna Array Lattice Resonances with Engineered Gain and Loss*, 21st International Conference on Transparent Optical Networks (ICTON), Angers, France, July 9-13, 2019. (invited talk).
7. A.F. Koenderink, *Phase and polarization-resolved radiation patterns of single nano-objects and embedded eigenstates*, Optics at the Nanoscale (ONS'19), Anacapri, Island of Capri, Italy, September 9-11, 2019. (invited talk)

2020

1. A. F. Koenderink, K. Cognée, A. Berkhout, H. M. Doeleman, T. A. W. Wolterink, I. M. Palstra, and P. Lalanne, *“Cavity-coupled plasmonic phased array antennas”*, SPIE Optics + Photonics, San Diego, USA, Aug. 24-28 2020, held as online event.
2. A. F. Koenderink, *“Metasurfaces and Fourier Imaging for Sensing and Metrology”*, Metamaterials'2020, The 14th International Congress on Artificial Materials for Novel Wave Phenomena, New York, USA, 28 Sep - 2 Oct 2020 (held as online event).
3. A. F. Koenderink, *“Metasurfaces and Fourier Imaging for Sensing and Metrology”*, Metamaterials'2020, The 14th International Congress on Artificial Materials for Novel Wave Phenomena, New York, USA, 28 Sep - 2 Oct 2020 (held as online event).

4. A. F. Koenderink, *“Fourier spectroscopy for Nanophotonics”*, EUPROMETA Doctoral School, New York, USA, 2-3 Oct 2020 (held as online event).
5. R. Kolkowski, S. Kovaivos, A. Berkhout, S. R. Abbing, C. Dieleman and A. F. Koenderink, *“Collective Resonances of Plasmonic Metasurfaces as an Experimental Platform for Nonlinear and Non-Hermitian Physics”* 2020 22nd International Conference on Transparent Optical Networks (ICTON), Bari, Italy, July 19-23 2020 (held as online event).
6. R. Kolkowski, S. Kovaivos and A. F. Koenderink, *“Trapping light in resonant metasurfaces for plasmon lasing”*, 5th International Conference on Metamaterials and Nanophotonics METANANO 2020, St. Petersburg, Russia, 14-18 September 2020 (held as online event).

2021

1. A. F. Koenderink, *“Photonic-plasmonic hybrid resonators and molecular optomechanics”*, SPIE Optics + Photonics (Active Photonic Platforms symposium), San Diego US (hybrid), 1-5/08/2021.
2. A. F. Koenderink, *“Metasurfaces for nano-optical sensing”*, URSI-GASS 2021 (International Union of Radio Science General Assembly), Rome Italy (hybrid), 28/08–4/09/2021.
3. A. F. Koenderink, *“Strong coupling, cooperative effects and high-Q plasmonic modes in metasurface etalons and plasmon antenna-microcavity hybrids”*, Metamaterials 2021, The Fifteenth International Congress on Artificial Materials for Novel Wave Phenomena – Metamaterials 2021, New York US (hybrid), 20-25/09/2021.

2022

1. I. Shlesinger, *Selective Enhancement of Raman Scattering with a Nanocube-on-Mirror in a Cavity*, META'22. The 12th International Conference on Metamaterials, Photonic Crystals and Plasmonics. Torremolinos, Spain, 19-22/07/2022.
2. A.F. Koenderink, *Ultrafast studies of amplifying and nonlinear metasurfaces*, SPIE Optics + Photonics, San Diego, California, USA, 22-24/08/2022.
3. A.F. Koenderink, *Nanophotonic structures for side-band resolved molecular optomechanics*, Metamaterials'2022. The 16th International Congress on Artificial materials for Novel Wave Phenomena, Siena, Italy, 12-17/09/2022.
4. A.F. Koenderink, *Light-matter interaction. Purcell factor, LDOS, spontaneous emission & SERS*. The Foremost Photonics 2022, Ettore Majorana Foundation and Centre for Scientific Culture, Erice, Sicily, 10-14/10/2022.

Academic teaching 2017-2022

2018

1. A.F. Koenderink, MSc level course Nanophotonics, AMEP track, Universiteit van Amsterdam (6 ECTS course).

2019

1. A.F. Koenderink, MSc level course Nanophotonics, AMEP track, University of Amsterdam (6 ECTS course).

2020

1. A.F. Koenderink, MSc level course Nanophotonics, AMEP track, University of Amsterdam (6 ECTS course).

2021

1. A.F. Koenderink: MSc level course Nanophotonics, AMEP track, University of Amsterdam (6 ECTS course). Course redesigned with Dr. J. van de Groep.

2022

1. A.F. Koenderink, MSc level course *Nanophotonics*, AMEP track, University of Amsterdam, The Netherlands (6 ECTS course).

Selected awards & recognitions 2017-2022

2017

1. A.F. Koenderink, Member, the DJA (Young Academy) of the KNAW (till March 2017).

2018

1. A. F. Koenderink, ACS Photonics Young Lectureship Award 2018.
2. H. M. Doleman, SPIE Best Student Paper Award, SPIE Optics + Photonics 2018, Active Photonic Platforms Symposium, San Diego, USA, August 19-23, 2018.
3. K. G. Cognée, annual meeting of the European Optical Society EOSAM 2018, Best student poster presentation award 2018.

2019

1. H.M. Doleman, NWO Natuurkunde proefschriftprijs (annual prize for the best PhD thesis in physics in the Netherlands).
2. H.M. Doleman, Doctorate *cum laude*.

2022

1. A.F. Koenderink, Elected Optica Fellow, 2022.
2. N. de Gaay Fortman, Best poster award, *Optical gain and lasing at different order K-points of active plasmonic metasurfaces*, Metamaterials 2022. The 16th International Congress on Artificial materials for Novel Wave Phenomena, Siena, Italy, 12-17/09/2022.

Valorization 2017-2022

1. A.F. Koenderink, C. Guo (2017-2018, consultancy / R&D project with industry). *Nanophotonics level-2 banknote security feature*. Project with P. Balke (Dutch Central Bank) and M.A. Verschuuren (Philips / SCIL Nanoimprint solutions BV). The developed technology was transferred for patenting to Philips IP & S, and we presented it at the highest level of the Dutch Central Bank (Klaas Knot, President) and European Central Bank (Yves Mersch, ECB Executive Board).
2. A.F. Koenderink, C. Guo (2014-2018, joint project with industry), *Low-extended light sources* (STW ASLS project, 50% cofunded by Signify Philips), collaboration with Dr. D.K.G. de Boer and Dr. H. Jagt (Philips Lighting / Signify). Aside from the collaboration the project, which resulted in 8 publications, also led to knowledge exchanges, for instance in form of lectures on nanophotonics for emission control presented to the Philips Lighting/Signify research team.
3. A.F. Koenderink, R. Röhrich (2016-2020, joint project with industry). *Unconventional metrology: merging nanophotonics with computational imaging*. AMOLF-ARCNL-ASML PhD project on overlay metrology targets. This project (6 publications) resulted in joint publications with ASML, and one IDF submitted to ASML (archived, not retained for patenting).
4. A.F. Koenderink, R. Buijs, T. Wolterink, E. Verhagen (2018-2021, joint project with industry). *Reconfigurable meta-instruments for sensing and inspection* (TTW-HTSM project with TNO-Optics,

and users from ASML, Bruker, VSL, ESA). Aside from the collaboration the project (8 publications) also led to knowledge exchange, for instance in form of lectures on nanophotonics presented at TNO-Optics.

5. A.F. Koenderink, D. Pal (2019 - present, joint project with industry, leading to filed IP). *Nanophotonics for next generation LEDs*, collaboration with Lumileds (T. Lopez, M. Böhmer, A. Abbass) and the team of Rivas at TU/e. The project resulted in technology transfer to Lumileds, which filed 4 US patents with our team as inventors (2021 and 2022).
6. A. F. Koenderink, F. Bijloo, N. Feldman (2021- joint project with industry, leading to IP). *Maximum information scatterometry on metasurface targets* and *Nonlinear metasurfaces for metrology*. Ongoing joint PhD projects in the AMOLF-ARCNL-ASML program already resulted in 3 IDFs, of which one filed for patenting by ASML (2022).
7. A.F. Koenderink, I. Shlesinger, E. Verhagen and J. Vandersmissen (2018-2022, joint project with industry). *THz detector technology based on molecular optomechanics* (FET THOR project). Collaboration with Univ. Cambridge, UP Valencia, EPFL, UCL London and the THz company Lytid (Paris).
8. I. M. Palstra and A.F. Koenderink (2019, Open Code), *Python Toolbox for Unbiased Statistical Analysis of Fluorescence Intermittency of Multi-Level Emitters*. Open Source software toolbox for data analysis, available at ZENODO DOI: 10.5281/ zenodo.4742952
9. A. Berkhout (2019, Societal impact). *Nationale DenkTank 2019* (5 months full time secondment). The Nationale DenkTank aims to connect science, industry and society. Each year twenty highly motivated academic talents are selected to brainstorm on and shape solutions to a problem relevant to society, and posed by societal stakeholders. The subject of 2019 was the digital society. The report "Optimaal Digitaal" is available as PDF at <https://ndt19.nl/>.
10. A.F. Koenderink (2022, Lecture), *Fourier microscopy in nanophotonics*, seminar/tutorial presented at ASML research group Computational Methods for Metrology and Sensors (company contacts L. Tripodi, O. El Gawahary), ASML Research, Veldhoven, 14/11/2022.