

Unit Name

Light-Matter Interactions for Quantum Technologies Unit

Collaborations

I Toftul, G Tkachenko, ANU, University of Bordeaux, Australia, France, Transverse spin effects

X Han, Dalian University of Technology, China, Sensing, Imaging, and Raman Spectroscopic Investigation with Plasmonic Nanocavities

K Moelmer, J Robert, E Brion, D Kornovan, D Brown, R Lowe, Niels Bohr Institute, ENS Paris Saclay, University of Toulouse, Aarhus University, UCL, University of Stuttgart, Denmark, France, Denmark, UK, Germany, Rydberg atom excitation using optical nanofibres

D Budker, University of Mainz, Germany, Quantum sensing using NV Diamond

T Carmon, Technion, now Tel-Aviv University, Israel, Plasma in microbubble cavities

T Busch, D Kornovan, Quantum Systems Unit OIST, Aarhus University, Japan, Denmark, Neutral atoms and optical nanofibres

YU Lee, S Lee, Chungbuk National University, Zhejiang University, South Korea, China, Nano-imaging techniques

K Tian, S Li, M Jang, Harbin Engineering University, Zhejiang University, University of California, Irvine, China, China, USA, Imaging of WGM resonators

D Kotsifaki, F Cichos, Duke Kunshan University, University Leipzig, China, Germany, Bio-Sensing, Imaging, and Optical Trapping and Manipulation with Plasmonics Tweezers

A K Srivastava, IIT Bombay, India, 2D materials integrated with WGM cavities

Type of collaboration

Research Personnel

Viet Giang Truong, Senior Staff Scientist

Christophe Pin, Staff Scientist

Ramgopal Madugani, Staff Scientist

Wenfang Li, Staff Scientist

Souvik Sil, Postdoctoral Scholar

Dylan Brown, Postdoctoral Scholar

Ramgopal Madugani, Postdoctoral Scholar

Fathy Hassan, Postdoctoral Scholar

Krisnha Jadeja, Postdoctoral Scholar

Metin Ozer, Research Unit Technician

Kristoffer Karlsson, Research Unit Technician

Praveen Kamath Pramitha, PhD Student

Shahrabifarahani Zohreh, PhD Student

Jalaludeen Mohammed Zia, PhD Student

Begumya Samuel, PhD Student

Jose Amal, PhD Student

Kortel Anna, PhD Student

Altabbaa Hania, PhD Student

Maeda Maki, PhD Student

Vylegzhanin Alexey, PhD Student

Abdrakhmanov Sergei, PhD Student

Raj Aswathy, PhD Student

Scholarly Contributions and Creative Productions (by Faculty)

Conference Proceedings

1. Raj, A.; Giricz, V.; Brown, D.; Vylegzhanin, A.; Chormaic, S.
Cold Rydberg Atom Excitation Mediated via an Optical Nanofiber. In Proceedings Volume 12993, Quantum Technologies 2024; p 1299302.
2. Jose, A.; Madugani, R.; Kalra, R.; Chormaic, S.
Magnetospirillum Bacteria Sensing Using a Microbubble WGM Resonator. In Proceedings Volume 13004, Nonlinear Optics and its Applications 2024; p 1300403.
3. Suslin, G.; Truong, V. G.; Chormaic, S.
Particle Trapping Using Plasmonic Arrays. In Proceedings Volume 12991, Nanophotonics X; 2024; p 1299106.
4. Kamath, P.; Sil, S.; Truong, V. G.; Chormaic, S.
Particle Manipulation Using Optical Nanofibers. In Proceedings Volume 13001, Specialty Optical Fibres VIII; 2024; p 130010E.

Journal Article

1. Vylegzhanin, A.; Nic Chormaic, S.; Brown, D.
Rydberg Electromagnetically Induced Transparency Based Laser Lock to Zeeman Sublevels with 0.6 GHz Scanning Range. Review of Scientific Instruments 2024, 95, 113001.
2. Hassan, F.; Velmurugan, N.; Yamane, Y.; Nic Chormaic, S.; Luscombe, C.
One-Step Palladium-Catalyzed Heterocyclic Ring Closure of Benzofurans with Aryl Iodides through a Heck-Type Pathway. Organic Letters 2024, 26, 9741.
3. Rodemund, T. S.; Nic Chormaic, S. G.; Hentschel, M.
Coupled Deformed Microdisk Cavities Featuring Non-Hermitian Properties. Applied Physics Letters 2024, 124, 051107.
4. Peters, M.; Zhao, T.; George, S.; Truong, V. G.; Nic Chormaic, S. G.; Ying, C.; Nome, R. A.; Gordon, R.
Energy Landscape of Conformational Changes for a Single Unmodified Protein. Npj biosensing 2024, 1, 14.
5. Choi, K.-R.; Li, S.; Park, D. H.; Joo, B. C.; Lee, H.; Kang, E. S. H.; Nic Chormaic, S. G.; Wu, J. W.; D'Aléo, A.; Lee, Y. U.
Photoluminescence Lifetime Engineering via Organic Resonant Films with Molecular Aggregates. Nanophotonics 2024, 13, 1033–1037.
6. Li, W.; Brown, D.; Vylegzhanin, A.; Shahrabifarahani, Z.; Raj, A.; Du, J.; Nic Chormaic, S.
Atom-Light Interactions Using Optical nanofibres—A Perspective. JPhys Photonics 2024, 6, 021002.
7. Li, A.; Ward, J.; Tian, K.; Yu, J.; She, S.; Hou, C.; Guo, H.; Chormaic, S.; Wang, P.

Evaporation Characteristics of Er³⁺ Doped Silica Fiber and Its Application in the Preparation of Whispering Gallery Mode Lasers. *Optics Express* 2024, 32, 3912.

Presentation at Conference

1. Nic Chormaic, S. G.; Viet Giang, G.
Metamaterial Tweezers for Trapping and Distinguishing Nanoparticles. *SPIE Photonics West 2025*.
2. Nic Chormaic, S. G.; Jalaludeen, M. Z.; Begumya, S.; Li, S.
Integrating NV-Center Diamonds with Hollow Whispering Gallery Resonators for Quantum Sensing. *SPIE Photonics West 2025*.
3. Nic Chormaic, S. G.
Towards the Generation of a 1D Rydberg Atom Array near an Optical Nanofibre. *QLIME 2024*.
4. Nic Chormaic, S. G.
Trapping Nanoparticles Using Metamaterials. *NFO-17 2024*.
5. Nic Chormaic, S. G.
Optical Nanofibres - a Tool for Cold Atom and Microparticle Manipulation. *AIP Congress 2024*.
6. Nic Chormaic, S. G.
Emission Patterns from 2D and 3D Deformed Microcavities. *WOMA 2024*.
7. Nic Chormaic, S. G.
Integrating Optical Nanofibres with Cold Rubidium Ground State and Rydberg Atoms. *EOSAM 2024*.
8. Rodemund, T. S.; Nic Chormaic, S. G.; Hentschel, M.
Coupled Microdisk Cavities: Emission Pattern from Circular versus Deformed Geometries. *Nonlinear Photonics, Advanced Photonics Congress 2024*.
9. Kamath, P. P.; Sil, S.; Truong, V. G.; Nic Chormaic, S. G.
Particle Manipulation Using Optical Nanofibers. *SPIE Photonics Europe 2024*.
10. Suslin, G.; Truong, V. G.; Nic Chormaic, S. G.
Particle Trapping Using Plasmonic Arrays. *SPIE Photonics Europe 2024*.
11. Raj, A.; Giricz, V. L.; Brown, D.; Vylegzhanin, A.; Nic Chormaic, S. G.
Cold Rydberg Atom Excitation Mediated via an Optical Nanofiber. *SPIE Photonics Europe 2024*.

Seminars

1. Nic Chormaic, S. G.
Trapping Micro- and Nanoparticles Using near Field Optics. 2024.
2. Nic Chormaic, S. G.
Expedition to Antarctica - Towards a Sustainable Leadership. 2024.

Scholarly Contributions (by Unit Members)

Name of Unit Member	Type	Title	Outlet	Publisher	Year Pub
Zohreh Shahrabifarahani	Poster Presentation at Conference	Two-correlated photon generation using optical nanofiber-trapped cold atoms A Pasway to "heralded single-photon sources"	ONNA 2025	Bad Honnef, Germany	2025
Mohammed Zia Jalaludeen	Poster Presentation at Conference	Development of vector magnetometer based on hollow core whispering gallery	WOMA 2024	Dunedin, New Zealand	2024

Name of Unit Member	Type	Title	Outlet	Publisher	Year Pub
		resonators and nitrogen vacancy centers in diamond			
Ramgopal Madugani	Poster Presentation at Conference	Precision spectral and spatial optimisation of whispering gallery modes in microbubble cavities	WOMA 2024	Dunedin, New Zealand	2024
Zohreh Shahrabifarahani	Poster Presentation at Conference	Two photon generation using optical nanofiber-trapped cold atoms, a pathway to “heralded single-photon sources”	Quantum Innovation 2024	Tokyo, Japan	2024
Mohammed Zia Jalaludeen	Poster Presentation at Conference	Quantum sensing based on a hollow core whispering gallery resonator and nitrogen vacancy centers in diamond	Quantum Innovation 2024	Tokyo, Japan	2024
Aswathy Raj	Poster Presentation at Conference	Rydberg excitation from a linear array of trapped atoms at the interface of an optical nanofiber	CQD2024	Okinawa, Japan	2024
Samuel Begumya	Poster Presentation at Conference	Coupling of NV centers in diamond to adiabatically tapered optical nanofibers	CQD2024	Okinawa, Japan	2024
Amal Jose	Poster Presentation at Conference	Hollow, Egg-like Whispering Gallery Mode Resonator	The 9th Photonics Workshop	Naha, Japan	2024
Zohreh Shahrabifarahani	Poster Presentation at Conference	Structured optical nanofibers for atom trapping	CQD2024	Okinawa, Japan	2024
Mohammed Zia Jalaludeen	Poster Presentation at Conference	Development of magnetometer using hollow core microresonators and nitrogen vacancy centers in diamond	CQD2024	Okinawa, Japan	2024
Kyu-Ri Choi	Poster Presentation at Conference	Characterization of laser-written nitrogen-vacancy centers in diamond with super-resolution fluorescence microscopy	CLEO-PR 2024	Incheon, South Korea	2024
Aswathy Raj	Poster Presentation at Conference	ydberg excitation from a linear array of trapped atoms at the interface of an optical nanofiber	28th International Conference on Atomic Physics (ICAP 2024)	London, UK	2024
Alexey Vylegzhanin	Poster Presentation at Conference	Nanofiber-based state-insensitive light-induced magnetic field trap for ground and Rydberg Rubidium-87 atom	Ultracold Atoms Japan	Okinawa, Japan	2024
Ramgopal Madugani	Poster Presentation at Conference	Whispering Gallery Mode Optimisation by Precision Microbubble Cavity Fabrication	ONNA 2025	Bad Honnef, Germany	2025
Krishna Jadeja	Poster Presentation at Conference	Rydberg interactions with an optical nanofibre	ONNA 2025	Bad Honnef, Germany	2025

Name of Unit Member	Type	Title	Outlet	Publisher	Year Pub
Samuel Begumya	Poster Presentation at Conference	Quantum sensing with NV centres in nanodiamonds coupled to optical nanofibres and microresonators	ONNA 2025	Bad Honnef, Germany	2025
Anna Kortel	Poster Presentation at Conference	Interaction of charged ONF with Rydberg atoms	ONNA 2025	Bad Honnef, Germany	2025
Pramitha Praveen Kamath	Poster Presentation at Conference	Microparticle manipulation in the evanescent field of an optical nanofiber	ONNA 2025	Bad Honnef, Germany	2025
Samuel Begumya	Poster Presentation at Conference	Coupling of NV centers in diamond to optical nanofibers	WOMA 2024	Dunedin, New Zealand	2024
Amal Jose	Poster Presentation at Conference	Hollow, Egg-like Whispering Gallery Mode Resonator	WOMA 2024	Dunedin, New Zealand	2024
Sergei Abdrakhmanov	Poster Presentation at Conference	Trapping Schemes for Cold Ground and Rydberg State Rubidium Atoms near an Optical Nanofiber	CAPS and CQA Winter School on Ultracold Quantum Many-body Systems	Benasque, Spain	2025
Aswathy Raj	Presentation at Conference	Rydberg atom interactions at the interface of an optical nanofiber	ONNA 2025	Bad Honnef, Germany	2025
Christophe Pin	Presentation at Conference	Fabrication of VO2 micro-nanostructures by laser-induced hydrothermal synthesis	CIF 2024, Chitose	Chitose, Japan (online)	2024
Christophe Pin	Presentation at Conference	Plasmonic nano-vortex field excited by a circularly-polarized plane wave	JSAP Autumn meeting	Niigata, Japan (online)	2024
Christophe Pin	Presentation at Conference	Fabrication of vanadium dioxide micro- and nanostructures by laser-induced hydrothermal synthesis	META2024	Toyama, Japan	2024
Christophe Pin	Presentation at Conference	Plasmonic nanogap optical vortex excitation via spin-to-orbital angular momentum conversion	OMC 2024	Yokohama, Japan	2024
Christophe Pin	Presentation at Conference	Beyond optical chirality: A brief introduction to chiral phenomena in optics	OIST-JST-AIMR Joint International Symposium: Interaction Between Various Chiral Fields and Chiral Materials, OIST	Okinawa, Japan	2024
Christophe Pin	Presentation at Conference	Singular field in the nanogap of a plasmonic multimer antenna excited by a circularly-polarized plane wave	WOMA 2024	Dunedin, New Zealand	2024
Viet Giang Truong	Presentation at Conference	Hybrid metamaterial plasmonic tweezers for trapping and	META2024	Toyama, Japan	2024

Name of Unit Member	Type	Title	Outlet	Publisher	Year Pub
		manipulating dielectric particles and biomolecules			
Alexey Vylegzhanin	Presentation at Conference	Excitation of Rb-87 Rydberg atoms next to an optical nanofiber	CQD2024	Okinawa, Japan	2024
Christophe Pin	Presentation at Conference	Electric field spin skyrmion generated by plasmonic nanostructures	JSAP Autumn meeting	Niigata, Japan (online)	2024
German Suslin	Presentation at Conference	Fano-resonant plasmonic metamaterials for nanoparticles photoluminescence enhancement	OMC 2024	Yokohama, Japan	2024
Amal Jose	Presentation at Conference	Magnetospirillum bacteria sensing using a microbubble WGM resonator	SPIE Photonics Europe	Strasbourg, France	2024
Alexey Vylegzhanin	Presentation at Conference	Fictitious magnetic field trap for ground and Rydberg state 87Rb atom	CLEO-PR 2024	Incheon, South Korea	2024
Alexey Vylegzhanin	Seminars	Excitation of 87Rydberg atoms next to an optical nanofiber	Ioffe Physical-Technical Institute (online)	Saint-Petersburg, Russia	2024
Fathy Hassan	Seminars	Development of Photonic and Electronic Materials using Binaphthyl Derivatives	Opera Seminar 251, Kyushu University	Fukuoka, Japan	2024
Viet Giang Truong	Seminars	Metamaterial plasmonic tweezers for stable nanoscale trapping and beyond	MEXT Grant-in-Aid for Scientific Research "Luminescence induced optical force" Joint Seminar, OIST	Okinawa, Japan	2024
Christophe Pin	Seminars	Plasmonic nanogap antennas designed for the excitation of optical nanovortices	MEXT Grant-in-Aid for Scientific Research "Luminescence induced optical force" Joint Seminar, OIST	Okinawa, Japan	2024

Honors, Awards & Fellowships

Sep 2021 - Ongoing	Visiting Scientist Award, 2021, LabEX PALM, France
May 2023 - Ongoing	Visiting Scientist award from Chemnitz University of Technology, 2023, Chemnitz University of Technology
2024-07-26 - Ongoing	SPIE Senior Member, SPIE シニアメンバー, 2024, SPIE
2020-09-01 - Ongoing	2021 OSA Fellow, 2021 OSA フェロー, 2020, Optical Society

Honors, Awards & Fellowships (only by unit members)

2024-11-29 Mohammad Zia Jalaludeen, PhD Student, 正規学生, 2024, WOMA 2024 conference, 正規学生のジャラルディーン モハンメド ズィアは WOMA 2024 学会でベストポスター賞を受賞しました。

Outreach Activities (For Unit Members Only)

2024-06-13 Ramgopal Madugani, Whispering gallery microcavities, Wuhan University of Technology, China

Workshops and Seminars (Organized and Hosted by Faculty/Units)

Speaker Name(s)	Title	Location	Co-Organizers	Date
Dr Mikael Käll	Micro- and Nanomotors Driven by Optical Forces and Torques	C209, OIST		2025-04-11
Dr Domna Kotsifaki	Plasmonic Optical Tweezers: From Nanoparticles Trapping to Biomolecules Manipulation	on Zoom		2025-04-10
Dr Georgiy Tkachenko	Multipliers of orbital angular momentum of light	on Zoom		2025-04-09
Maya Beano	Bridging Science and Art: A Journey from Medicinal Chemistry to Photographic Expression	C210, OIST		2025-04-08
Dr Beibei Li	Ultrasensitive ultrasound sensing with integrated optical microresonators	on Zoom		2025-04-03
Dr Takasumi Tanabe	Nonlinear Photonics in High-Q Microcavities: From All-Optical Switches to Microresonator Frequency Combs	C209, OIST		2025-03-10
Dr Silvie Bernatova	Principles and applications of optical and acoustic trapping combined with Raman spectroscopy	on Zoom		2025-02-17
Dr Jameesh Keloth	Individually Addressable Atom Array Coupled to an Optical Nanofiber Cavity: Advancing Towards Quantum Computing with Optical Nanofiber Cavity-QED	B503, OIST		2025-02-06
Dr Peter Simon Mekhail	Imaging in 3D and other fun things to do through multimode fibres	C209, OIST		2025-02-03
Dr Hajime Ishihara	Luminescence induced optical force	C210, OIST		2024-10-20
Dr Robert Loew	An Ion Meets a Rydberg atom	E48, OIST	OCQT Colloquium	2024-09-05