**Philippe GOLDNER,** born 1966, Saint-Avold, France
**Senior Researcher** (Directeur de recherche) at CNRS (National Center for Scientific Research)
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## EDUCATION

2003 : 'Habilitation à Diriger des Recherches', Université Pierre et Marie Curie, Paris
1990-1993 : PhD in material science, Université Pierre et Marie Curie, Paris
Topic: Upconversion processes in rare earth doped pairs. Supervisor: Dr. F. Pellé
1987-1990 : Ecole Centrale Paris graduate school (ranked among the top 3 French graduate schools)

## POSITIONS HELD

2020 : CNRS Senior scientist, Chimie ParisTech (Directeur de Recherche DR1)
2012-2016 : CNRS Scientific Excellence Award (PES)
2002- : Head of the team "Crystals and Quantun State Dynamics", Chimie Paristech
2008-2010 : Head of the "Materials for Photonics" group, Chimie Paristech
2006- : CNRS Senior scientist, Chimie ParisTech (Directeur de Recherche DR2)
1995-1999 : Visiting scientist, French National Center for Telecommunications, Bagneux, France
1993-2006 : CNRS Junior scientist (Chargé de Recherche CR2), CNRS Meudon-Bellevue, France

## RESEARCH

PhD work focused on luminescence and energy transfer processes in a rare earth doped bromide crystal. Later studies on clustering in telecom glasses revealed by optical spectroscopy and crystals for high power lasers.
Current work deals with optical and spin quantum state dynamics in rare earth doped crystals for applications to optical quantum information processing, signal processing, metrology and medical imaging (see http://www.cqsd.fr for more details).
4 invited papers, 3 review papers, 1 book, 3 book chapters, more than 160 articles in peer-reviewed journals, 36 invited conferences, 51 invited seminars, more than 130 oral presentations.
h= 33, 4400 citations.
Coordinator of the H2020 FET Open project NanOQTech (Rare earth doped nanoscale systems for optical quantum technologies), 9 EU partners, 3.3 M€ budget.
Winner of the ERC Advanced Grant RareDiamond in 2021 (Rare Earth - Diamond Hybrid Materials for Photonics), 2.5 M€ budget.

## THESIS SUPERVISION

F. Montjovet-Basset, P. Perrin, V. Grand d'Esnon, Maria Arranz, E. Lafitte-Houssat (2022), A. Fossati (2019), M. Scarafagio (2019), S. Welinski (2018), K. de Oliveira Lima (2015), B. Tumino (2013), R. Marino (2011), F. Beaudoux (2010), P-O. Petit (2009), P. Higel (2006), J. Petit (2006), B. Schaudel (2000).

## POSTDOCTORAL RESEARCHER SUPERVISION

J. Panigrahi, I. Balasa, F. Chiossi, M. Persechino (2019), S. Liu (2017-2019), Z. Zhang (2018-2019), J. Karlsson (2016-2017), J. Bartholomew (2015-2016), N. Kunkel, S. Ilas (2014-2015), A. Arcangeli (2012-201s4), M. Lovric (2012), D. Paboeuf (2009-2011), J. Vincent (2007), V. Escax-Basquet (2005), B. Savoini (2001).

**AWARDS AND FELLOWSHIPS**

2022 : CNRS Silver Medal
2020 : Stars of Europe (France)
2017 : French-Brazilian Excellence Chair at the University of São Paulo, Brazil,
2015 : Erskine fellow, University of Canterbury, Christchurch, New-Zealand

**TEACHING**

2021- : "Materials for optical quantum technologies", Master 2, PSL
2020- : "Rare Earths for quantum technologies", Master 2, Ecole polytechnique
2020- : “Mathematics applied to physics”, Chimie Paristech
2014-2018 : "Quantum information processing and communication", Institute of Technology and Innovation, PSL
2009-2018 : "Introduction to quantum information processing", master course, Université Pierre et Marie Curie
2008-2013 : “Optical processing of information”, master course, Universidad Autónoma, Madrid
2008-2013 : Head of quantum mechanics and math teaching, Chimie Paristech
2004-2013 : “Optical materials”, master course, Chimie Paristech
2003-2013 : “Mathematics applied to physics” first year students, Chimie Paristech
1996-2000 : "Quantum mechanics", tutorials, Ecole centrale Paris

**FUNDING**

French National Research Agency, French Defense Agency, French Medical Research Agency, EADS, Corning, Thales, European Community (FP5, FP7, H2020), Paris area regional funding.

**SELECTED PROJECTS**

2021-2026 : Rare earth-diamond hybrid materials for photonics ERC Advanced Grant (EU H2020)
2020-2024 : Ultra-high-resolution optical spectroscopy of nano particles (French ANR, coordinator)
2018-2021 : Advanced Science and Technology for Enhancing Metrology Through Diamond (EU Quantum Flagship H2020)
2018-2021 : Scalable Rare Earth Ion Quantum Computing Nodes (EU Quantum Flagship H2020)
2016-2019 : Nanoscale Systems for optical quantum technologies (EU FET Open H2020-coordinator)
2015-2017 : Suppressing dephasing by controlled chemical disorder (French ANR, coordinator)
2014-2015 : Crystals and optical information processing (French PSL, coordinator)
2013-2015 : Random Materials with long optical coherence lifetimes (French ANR, coordinator)
2013-2015 : Rare earth doped crystals for ultra-high stability (French DIM Nano-K)
2012-2015 : Coherent Information Processing in Rare Earth Ion Doped Crystals (EU Marie-Curie ITN, FP7, WP leader)
2010-2012 : Quantum Repeaters for Long Distance Fiber-Based Quantum Communication (EU FP7, WP leader)
2003-2005 : Experimental realization of quantum gates and development of scalable quantum schemes in rare-earth doped inorganic crystals (EU FP 5)

**MISCELLANEOUS**

2017- : Associate Editor, Journal of Luminescence
2009-2012 : Associate Editor, Optics Express, OSA
2016 : Chairman, 19$^{th}$ International conference on Dynamical Processes in Excited States of Solids - DPC'16, Paris
2007 : Co-chairman, EMRS Spring Meeting, Symposium “Rare Earth Doping for Photonics Applications”, France

2010 : Co-chairman of the International Symposium on Optical Manipulation of Quantum Information in Solids (ISOMQIS 2010), Paris, France

2010- : International Committee Member, International Conference on Luminescence (ICL)

2013- : International Committee Member, International Conference on Dynamical Processes in Excited States of Solids (DPC)

2021- : Chairman of the International Committee International Conference on Dynamical Processes in Excited States of Solids (DPC)

Referee : Nature Physics, Nature Communications, Physical Review Letters, Physical Review B, Optica, Journal of Applied Physics, Applied Physics Letters, Optics Letters, Optics Express, Journal of Luminescence, Journal of Physics: Condensed Matter, JOSA B, Optical Materials and others.
Expert for ANR (France), DFG (Germany), NWO (The Netherlands), Marsden Fund (New-Zealand), FWF (Austria), for promotions of French Professor (University of Caen, Chimie ParisTech), Senior Lecturer at ANU (Canberra, Australia) and Associate Professor at Princeton University (USA).

**SELECTED RECENT PAPERS**


D. Serrano, S. K. Kuppusamy, B. Heinrich, O. Fuhr, D. Hunger, M. Ruben, and P. Goldner, Ultra-Narrow Optical Linewidths in Rare-Earth Molecular Crystals, **Nature** 603, 241 (2022).

K. S. Kumar, D. Serrano, A. M. Nonat, B. Heinrich, L. Karmazin, L. J. Charbonnière, P. Goldner, and M. Ruben, Optical Spin-State Polarization in a Binuclear Europium Complex towards Molecule-Based Coherent Light-Spin Interfaces, **Nature Communications** 12, 2152 (2021).

B. Casabone, C. Deshmukh, S. Liu, D. Serrano, A. Ferrier, T. Hümmer, P. Goldner, D. Hunger, and H. de Riedmatten, Dynamic Control of Purcell Enhanced Emission of Erbium Ions in Nanoparticles, **Nature Communications** 12, 3570 (2021).

S. Welinski, A. Tiranov, M. Businger, A. Ferrier, M. Afzelius, and P. Goldner, Coherence Time Extension by Large-Scale Optical Spin Polarization in a Rare-Earth Doped Crystal, **Phys. Rev. X** 10, 031060 (2020).

A. Fossati, S. Liu, J. Karlsson, A. Ikesue, A. Tallaire, A. Ferrier, D. Serrano, and P. Goldner, A Frequency-Multiplexed Coherent Electro-Optic Memory in Rare Earth Doped Nanoparticles, **Nano Lett.** 20, 7087 (2020).

S. Liu, A. Fossati, D. Serrano, A. Tallaire, A. Ferrier, and P. Goldner, Defect Engineering for Quantum Grade Rare-Earth Nanocrystals, **ACS Nano** 14, 9953 (2020).

T. Zhong and P. Goldner, "Emerging rare-earth doped material platforms for quantum nanophotonics," **Nanophotonics** 8, 2003–2015 (2019).

A. Ortu, A. Tiranov, S. Welinski, F. Fröwis, N. Gisin, A. Ferrier, P. Goldner, and M. Afzelius, "Simultaneous coherence enhancement of optical and microwave transitions in solid-state electronic spins," **Nature Materials** 17, 1–6 (2018).

D. Serrano, J. Karlsson, A. Fossati, A. Ferrier, and P. Goldner, "All-optical control of long-lived nuclear spins in rare-earth doped nanoparticles," **Nature Communications** 9, 2127 (2018).

J. G. Bartholomew, K. de Oliveira Lima, A. Ferrier, and P. Goldner, “Optical Line Width Broadening Mechanisms at the 10 kHz Level in Eu3+:Y2O3 Nanoparticles,” **Nano Letters**, vol. 17, 778–787 (2017).

C. Laplane, E. Zambrini Cruzeiro, F. Fröwis, Ph. Goldner, and M. Afzelius, "High precision measurement of the Dzyaloshinsky-Moriya interaction between two rare-earth ions in a solid," **Phys. Rev. Lett** 117, 037203 (2016).