

Alexis Jouan

PhD in Physics

OCG - LPEM - [ESPCI Paris - PSL](#)
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Assistant Professor
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Date of birth : 21/05/1989
Nationality : French
French Driving Licence (2017)



RESEARCH EXPERIENCE

2022 - today **Assistant Professor at [OCG - LPEM](#), ESPCI Paris - PSL, France**
Current Condensed Matter Physics in the THz regime

2020 - 2022 **Postdoc at [Quantum Circuit Group](#), Lyon, France**
(2 years) Superconducting qubit for quantum thermodynamics,
Adv : Benjamin Huard, ENS Lyon

2018 - 2020 **Postdoc at [The University of Sydney](#), Sydney, Australia**
(2 years) Dispersive Gate sensing for readout and Josephson junctions in topological materials,
Adv : David Reilly, The University of Sydney and Microsoft

2013 - 2017 **PhD in Physics at [ESPCI](#), Paris, France**
(3.5 years) Control of Superconductivity in a Two-dimensional Electron Gas at Oxides interfaces,
Adv : Pr. Jérôme Lesueur and Dr. Nicolas Bergeal, ESPCI, Paris

2013 - 2017 **Labwork tutor - Quantum Physics**
(3.5 years) Optical pumping in Rb gas
Master students at ESPCI, Paris

2012 **Master Internship**
(6 months) Properties of Majorana fermions wave functions in supercurrent-operated nanostructures
Adv. : Pr. Felix Von Oppen, Dr. Alessandro Romito, Dahlem Center for Complex Quantum
Systems and Fachbereich Physik, Freie Universität Berlin

2011 **Undergraduate Research Internship**
(2 months) Design and setup of a magneto-optical trap
Adv. : Pr. Frédéric Chévy, Dr. Diogo Fernandez, LKB lab, ENS, Paris

EDUCATION

- 2012 - 2013** **Condensed Matter Physics Master 2 - [ICFP](#)**
[Ecole Normale Supérieure \(ENS\)](#), Paris
- 2010 - 2012** **Bachelor of Science in Fundamental Physics**
[Ecole Normale Supérieure \(ENS\)](#), Paris
- 2007 - 2010** **Mathematics and Physics Prep School**
Lycée Condorcet and Lycée Louis Le Grand, Paris, France

SCIENTIFIC PUBLICATIONS

Multiband Effects in the Superconducting Phase Diagram of Oxide Interfaces [A. Jouan](#), S. Hurand, G. Singh, E. Lesne, A. Barthélémy, M. Bibes, C. Ulysse, G. Saiz, C. Feuillet-Palma, J. Lesueur and N. Bergeal [Advanced Materials Interfaces](#)

Two-gap $s\pm$ -wave superconductivity at an oxide interface G. Singh, G. Venditti, G. Saiz, G. Herranz, F. Sanchez, A. Jouan, C. Feuillet-Palma, J. Lesueur, M. Grilli, S. Caprara and N. Bergeal [Physical Review B](#)

Josephson junctions via anodization of epitaxial Al on an InAs heterostructure [A. Jouan](#), J.D.S Witt, G.C. Gardner, C. Thomas, T. Lindemann, S. Gronin, M.J. Manfra and D.J. Reilly [Appl. Phys. Lett. 119, 172601 \(2021\)](#)

Quantized conductance in a one-dimensional ballistic oxide nanodevice [A. Jouan](#), G. Singh, E. Lesne, D.C. Vaz, M. Bibes, A. Barthélémy, C. Ulysse, D. Stornaiuolo, M. Salluzo, S. Hurand, J. Lesueur, C. Feuillet-Palma and N. Bergeal, [Nature Electronics \(2020\)](#)

Gap suppression at a Lifshitz transition in a multi-condensate superconductor G. Singh, [A. Jouan](#), G. Herranz, M. Scigaj, F. Sanchez, L. Benfatto, S. Caprara, M. Grilli, G. Saiz, F. Couëdo, C. Feuillet-Palma, J. Lesueur, N. Bergeal, [Nature Material \(2019\)](#)

Gate-based single-shot readout of spins in silicon A. West, B. Hensen, A. Jouan, T. Tanttu, C.-H. Yang, A. Rossi, M. F. Gonzalez-Zalba, F. Hudson, A. Morello, D. J. Reilly, A. S. Dzurak, [Nature nanotechnology \(2019\)](#)

Josephson-like dynamics of the superconducting $LaAlO_3/SrTiO_3$ interface, S. Hurand, [A. Jouan](#), E. Lesne, G. Singh, C. Feuillet-Palma, M. Bibes, A. Barthélémy, J. E. Villegas, J. Lesueur, N. Bergeal. [Physical Review B \(99\), 104515](#)

Competition between electron pairing and phase coherence in superconducting interfaces, [A. Jouan](#), G. Singh, S. Hurand, J. Biscaras, C. Feuillet-Palma, G. Singh, R. Budhani, S. Caprara, M. Grilli, L. Benfatto, J. Lesueur, N. Bergeal. [Nat. Comm. vol. 9, 407 \(2018\)](#)

DC and AC transport in field-effect controlled $LaAlO_3/SrTiO_3$ interface, A. Jouan [PhD Thesis, Paris 6, 2017](#)

High-temperature superconducting nano-meanders made by ion irradiation, P. Amari, C. Feuillet-Palma, A. Jouan, F. Couëdo, N. Bourlet, E. Géron, M. Malnou, L. Méchin, A. Sharafiev, J. Lesueur, N. Bergeal

Superconductor Science and Technology, 2017

Effect of disorder on superconductivity and Rashba spin-orbit coupling in LaAlO₃/SrTiO₃ interfaces, G. Singh, [A. Jouan](#), S. Hurand, C. Feuillet-Palma, P. Kumar, A. Dogra, R. Budhani, J. Lesueur, N. Bergeal. [Physical Review B vol. 96, 2017](#)

Top-Gated field-effect LaAlO₃/SrTiO₃ devices made by ion-irradiation, S. Hurand, [A. Jouan](#), C. Feuillet-Palma, G. Singh, E. Lesne, N. Reyren, A. Barthélémy, M. Bibes, J.E. Villegas, C. Ulysse, M. Pannetier-Lecoœur, M. Malnou, J. Lesueur, N. Bergeal, [Applied Physic Letters vol. 108, 2016](#)

Engineering two-dimensional superconductivity and Rashba spin-orbit coupling in LaAlO₃/SrTiO₃ quantum wells by selective orbital occupancy, G. Herranz, G. Singh, N. Bergeal, [A. Jouan](#), J. Lesueur, J. Gázquez, M. Varela, M. Scigaj, N. Dix, F. Sánchez, J. Fontcuberta, [Nat. Com. vol. 6, 2016](#)

Field-effect control of superconductivity and Rashba spin-orbit coupling in top-gated LaAlO₃/SrTiO₃ devices S. Hurand, [A. Jouan](#), C. Feuillet-Palma, G. Singh, J. Biscaras, E. Lesne, N. Reyren, A. Barthélémy, M. Bibes, J.E. Villegas, C. Ulysse, X. Lafosse, M. Pannetier-Lecoœur, S. Caprara, M. Grilli, J. Lesueur, N. Bergeal, [Scientific Report vol. 5, 2015](#)

PUBLICATIONS IN PREPARATION

Cavity-photon induced state transitions in a Fluxonium qubit, [A. Jouan](#), J. Stevens, A. Bienfait, B. Huard In Preparation

CONFERENCES AND WORKSHOPS

- 11/2020** **Biannual Meeting of the French research community on Mesoscopic Physics**
Aussois, France : Oral presentation on quantum capacitance measurements in a spin qubit and in a quantum point contact
- 12/2015** **Biannual Meeting of the French research community on Mesoscopic Physics**
Aussois, France : Oral presentation on Field effect control of superconductivity and Rashba spin-orbit coupling in top gated LaAlO₃/SrTiO₃ devices
- 04/2015** **Capri Spring School on Transport in Nanostructures, with special focus on Topological superconductivity**
Capri, Italy : One week school
- 03/2015** **APS March Meeting 2015**
San Antonio, USA : Oral presentation
- 08/2014** **Condensed Matter in Paris CMD25**

Paris, France : Poster

06/2014

The New generation in Strongly Correlated Electrons Systems 2014

Nice, France : Poster

SKILLS AND EXPERTISE

Social skills

- Collaboration with other groups during PhD ([La Sapienza](#), Roma), oxyde film growth ([CNRS-Thales](#), Palaiseau), clean-room facilities ([LNP](#) Marcoussis, [Nanoscience Hub](#)), ions implantation (InESS, Strasbourg)
- Teaching labworks and tutorials at ESPCI and at the University of Sydney
- Working in a big team driven by a world leading company (Microsoft)
- Music and theater : study of clarinet for 13 years in Conservatory (CFEM diploma), theater and music hall performances, dance
- Student organisation : leader of Webradio [trENSmissions](#) at ENS

Technical skills

- **Cryogenics** : Dilution refrigerator He-Free Pulse Tube Systems
- **Low-noise DC Transport Measurements**, High Magnetic Fields (7T) with superconducting coil
- **High Frequency Measurements** : Design and Realisation of PCB, Vector Network Analyzer (VNA), calibration of RF setup
- **Micro- and Nanofabrication** : Optical and advanced E-Beam lithography, Clean Room Thin Films Deposition Processes (E-beam and Joule Metal Evaporation, RF sputtering for Dielectrics, Etching, Annealing, Lift-off), Thin Films Characterization (Atomic Force Microscope, Profilometer, Scanning Electron Microscope, Polarized Optical Microscope), High-Energy (50keV) Ion implantation in collaboration with InESS in Strasbourg

Computer skills

- Simulations on computer cluster, Matlab, Python, Qcodes, Mathematica, Origin, Comsol (electromechanical simulations), HFSS, Labview, Layout Editor, E-Line (e-beam lithography design), C++, html, LaTeX, Word, Excel

Sport

- Climbing, Running, and Volley ball