

UNIVERSITY OF MILAN

Selection procedure for recruiting associate professors under art.18, paragraph 1 and 4, of Law No.240/2010 for competition sector 02/B2 FISICA TEORICA DELLA MATERIA, (scientific-disciplinary sector FIS/03) at the Department of FISICA ALDO PONTREMOLI, (announcement published in Official Gazette No. 35 of 04-05-2021)
- Competition code 4584

Giovanni Sordi

CURRICULUM VITAE

PERSONAL DATA (DO NOT WRITE YOUR PERSONAL ADDRESS AND LANDLINE OR MOBILE PHONE NUMBER)

Surname	SORDI
Name	GIOVANNI
Date of Birth	2 MARCH 1979

EMPLOYMENT

Senior Lecturer (permanent position), since July 2020
Royal Holloway, University of London, Egham, United Kingdom

Lecturer (permanent position), February 2013 - June 2020
Royal Holloway, University of London, Egham, United Kingdom

Post-doctoral research associate, October 2010 - January 2013
Institut Laue-Langevin, Grenoble, France
Theory group

Post-doctoral research associate, October 2008 - September 2010
Département de Physique, Université de Sherbrooke, Québec, Canada
Research group of Prof. André-Marie Tremblay

EDUCATION AND QUALIFICATIONS

PhD in Physics, 2005 - 2008
Université Paris-Sud 11, Paris, France
Laboratoire de Physique des Solides, Orsay, France
PhD supervisor: Prof. Marcelo Rozenberg

Diplôme d'études approfondies de physique des solides et milieux denses, 2004 - 2005
Université Paris-Sud 11, Paris, France
Project supervisors: Prof. Marcelo Rozenberg and Prof. Antoine Georges

Attestato di formazione superiore, 1998 - 2003
Scuola Universitaria Superiore IUSS di Pavia, Pavia, Italy
Cum laude

Laurea in Physics, 1998 - 2003
Università di Pavia, Pavia, Italy
110/110 cum laude
Laurea supervisor: Prof. Alberto Rimini

RESEARCH

RESEARCH AUTHOR IDENTIFIER

orcid.org/0000-0003-2481-7544

RESEARCH INTERESTS

I'm a theoretical physicist in condensed matter. My research interests are in **strongly correlated systems** and their phase transitions. More specifically, I am interested in the **Mott transition** - a metal to insulator transition due to strong electron-electron interactions. This phenomenon is a central unsolved problem of modern condensed matter physics. It plays a key role in quantum materials and is at the forefront of theoretical and experimental research because it bears relevance for unconventional superconductivity, magnetism, and applications in novel electronics.

My main contributions to the study of the Mott transition are as follows.

- (1) Discovery of an unexpected first-order transition at finite doping in doped Mott insulators (see publication outputs #5, #6, #14, #20, #21).
- (2) Novel interpretation of the pseudogap temperature scale in high-temperature cuprate superconductors (#9, #10).
- (3) Study of the interplay between superconductivity, antiferromagnetism and Mott transition (#8, #13, #14, #16).
- (4) Quantum-information description of the Mott transition (#18, #19, #22, #23).

PUBLICATION OUTPUTS

I am author of 23 refereed articles, comprising 1 PNAS (in press), 5 Physical Review Letters, 2 Scientific Reports, 1 PRX Quantum, 3 Physical Review B Rapid Communications, and 11 Physical Review B (one of which has been selected as Editor's suggestion).

23. C. Walsh, M. Charlebois, P. Sémon, **G. Sordi**, and A.-M. S. Tremblay, *Information-theoretic measures of superconductivity in a two-dimensional doped Mott insulator*, accepted for publication in the Proceedings of the National Academy of Sciences (2021, in press) ISSN: 1091-6490 Corresponding author

22. C. Walsh, P. Sémon, **G. Sordi**, A.-M. S. Tremblay, *Entanglement and Classical Correlations at the Doping-Driven Mott Transition in the Two-Dimensional Hubbard Model*, PRX Quantum **1**, 020310 (2020). DOI: <https://doi.org/10.1103/PRXQuantum.1.020310> ISSN: 2691-3399 Corresponding author

21. **G. Sordi**, C. Walsh, P. Sémon, and A.-M. S. Tremblay, *Specific heat maximum as a signature of Mott physics in the two-dimensional Hubbard model*, Phys. Rev. B **100**, 121105(R) (2019). DOI: <https://doi.org/10.1103/PhysRevB.100.121105> ISSN: 2469-9950 Corresponding author

20. C. Walsh, P. Sémon, **G. Sordi**, A.-M. S. Tremblay, *Critical opalescence across the doping-driven Mott transition in optical lattices of ultracold atoms*, Phys. Rev. B **99**, 165151 (2019). DOI: <https://doi.org/10.1103/PhysRevB.99.165151> ISSN: 2469-9950 Corresponding author

19. C. Walsh, P. Sémon, D. Poulin, **G. Sordi**, A.-M. S. Tremblay, *Thermodynamic and information-theoretic description of the Mott transition in the two-dimensional Hubbard model*, Phys. Rev. B **99**, 075122 (2019). DOI: <https://doi.org/10.1103/PhysRevB.99.075122> ISSN: 2469-9950 Corresponding author

18. C. Walsh, P. Sémon, D. Poulin, **G. Sordi**, A.-M. S. Tremblay, *Local entanglement entropy and mutual information across the Mott transition in the two-dimensional Hubbard model*, Phys. Rev. Lett. **122**, 067203 (2019). DOI: <https://doi.org/10.1103/PhysRevLett.122.067203> ISSN: 0031-9007 Corresponding author

17. L. Fratino, M. Charlebois, P. Sémon, **G. Sordi**, A.-M. S. Tremblay, *Effects of interaction strength, doping, and frustration on the antiferromagnetic phase of the two-dimensional Hubbard model*, Phys. Rev. B **96**, 241109(R) (2017). DOI: <https://doi.org/10.1103/PhysRevB.96.241109> ISSN: 2469-9950 Corresponding author
16. L. Fratino, P. Sémon, M. Charlebois, **G. Sordi**, and A.-M. S. Tremblay, *Signatures of the Mott transition in the antiferromagnetic state of the two-dimensional Hubbard model*, Phys. Rev. B **95**, 235109 (2017). DOI: <https://doi.org/10.1103/PhysRevB.95.235109> ISSN: 2469-9950 Corresponding author
15. A. Reymbaut, M. Charlebois, M. Fellous Asiani, L. Fratino, P. Sémon, **G. Sordi**, A.-M. S. Tremblay, *Antagonistic effects of nearest-neighbor repulsion on the superconducting pairing dynamics in the doped Mott insulator regime*, Phys. Rev. B **94**, 155146 (2016). DOI: <https://doi.org/10.1103/PhysRevB.94.155146> ISSN: 2469-9950
14. L. Fratino, P. Sémon, **G. Sordi**, A.-M. S. Tremblay, *Pseudogap and superconductivity in two-dimensional doped charge-transfer insulators*, Phys. Rev. B **93**, 245147 (2016). DOI: <https://doi.org/10.1103/PhysRevB.93.245147> ISSN: 2469-9950 Corresponding author
13. L. Fratino, P. Sémon, **G. Sordi**, A.-M. S. Tremblay, *An organizing principle for two-dimensional strongly correlated superconductivity*, Scientific Reports **6**, 22715 (2016). DOI: <https://doi.org/10.1038/srep22715> ISSN: 2045-2322 Corresponding author
12. P. Sémon, **G. Sordi**, A.-M. S. Tremblay, *Ergodicity of the hybridization-expansion Monte Carlo algorithm for broken- symmetry states*, Phys. Rev. B **89**, 165113 (2014). DOI: <https://doi.org/10.1103/PhysRevB.89.165113> ISSN: 2469-9950
11. B. Chakrabarti, M.E. Pezzoli, **G. Sordi**, K. Haule, G. Kotliar, *α - γ transition in cerium: Magnetic form factor and dynamic magnetic susceptibility in dynamical mean-field theory*, Phys. Rev. B **89**, 125113 (2014). DOI: <https://doi.org/10.1103/PhysRevB.89.125113> ISSN: 2469-9950
10. **G. Sordi**, P. Sémon, K. Haule, and A.-M. S. Tremblay, *c-axis resistivity, pseudogap, superconductivity, and Widom line in doped Mott insulators*, Phys. Rev. B **87**, 041101(R) (2013). DOI: <https://doi.org/10.1103/PhysRevB.87.041101> ISSN: 2469-9950 First author
9. **G. Sordi**, P. Sémon, K. Haule, and A.-M. S. Tremblay, *Pseudogap temperature as a Widom line in doped Mott insulators*, Scientific Reports **2**, 547 (2012). DOI: <https://doi.org/10.1038/srep00547> ISSN: 2045-2322 First author
8. **G. Sordi**, P. Sémon, K. Haule, and A.-M. S. Tremblay, *Strong coupling superconductivity, pseudogap and Mott transition*, Phys. Rev. Lett. **108**, 216401 (2012). DOI: <http://dx.doi.org/10.1103/PhysRevLett.108.216401> ISSN: 0031-9007 First author
7. A. Amaricci, L. de Medici, **G. Sordi**, M. J. Rozenberg, M. Capone, *Path to poor coherence in heavy fermions from Mott physics and hybridization*, Phys. Rev. B **85**, 235110 (2012). DOI: <http://dx.doi.org/10.1103/PhysRevB.85.235110> ISSN: 2469-9950
6. **G. Sordi**, K. Haule, and A.-M. S. Tremblay, *Mott physics and first-order transition between two metals in the normal- state phase diagram of the two-dimensional Hubbard model*, Phys. Rev. B **84**, 075161 (2011). DOI: <http://dx.doi.org/10.1103/PhysRevB.84.075161> ISSN: 2469-9950 First author
5. **G. Sordi**, K. Haule, and A.-M. S. Tremblay, *Finite doping signatures of the Mott transition in the two-dimensional Hubbard model*, Phys. Rev. Lett. **104**, 226402 (2010). DOI: <https://doi.org/10.1103/PhysRevLett.104.226402> ISSN: 0031-9007 First author
4. M. Takizawa, M. Minohara, H. Kumigashira, D. Toyota, M. Oshima, H. Wadati, T. Yoshida, A. Fujimori, M. Lippmaa, M. Kawasaki, H. Koinuma, **G. Sordi**, M. J. Rozenberg, *Coherent and incoherent d band dispersions in SrVO₃*, Phys. Rev. B **80**, 235104 (2009). DOI: <http://dx.doi.org/10.1103/PhysRevB.80.235104> ISSN: 2469-9950

3. G. Sordi, A. Amaricci, and M. J. Rozenberg, *Asymmetry between the electron- and hole-doped Mott transition in the periodic Anderson model*, Phys. Rev. B **80**, 035129 (2009). DOI: <http://dx.doi.org/10.1103/PhysRevB.80.035129> ISSN: 2469-9950 First author
2. A. Amaricci, G. Sordi, and M. J. Rozenberg, *Non-Fermi Liquid Behavior in the Periodic Anderson Model*, Phys. Rev. Lett. **101**, 14640 (2008). DOI: <http://dx.doi.org/10.1103/PhysRevLett.101.146403> ISSN: 0031-9007
1. G. Sordi, A. Amaricci, and M. J. Rozenberg, *Metal-Insulator Transitions in the Periodic Anderson Model*, Phys. Rev. Lett. **99**, 196403 (2007). DOI: <https://doi.org/10.1103/PhysRevLett.99.196403> ISSN: 0031-9007 First author

PREPRINTS

1. A. Reymbaut, M. Boulay, L. Fratino, P. Sémon, Wei Wu, G. Sordi, A.-M. S. Tremblay, *Mott transition and high-temperature crossovers at half-filling*, arXiv:2004.02302 (2020) <https://arxiv.org/abs/2004.02302>

INVITED PRESENTATIONS SINCE 2011

7. Invited lecture series, *Summer School on Emergent phenomena in strongly correlated electrons*, Institut d'Etudes Scientifiques de Cargèse, France (5-17 August 2019): Introductory concepts to the Hubbard model
6. Invited talk, *SCES 2017*, Prague, Czech Republic (17-21 July 2017): An organizing principle for two-dimensional strongly correlated superconductivity
5. Invited talk, *New Generation in Strongly Correlated Electron Systems 2015*, Trogir, Croatia (13-18 September 2015): Remnant of the first-order Mott transition at finite doping as an organizing principle for strongly correlated superconductors
4. Invited talk, *Gordon Research Seminars*, Les Diablerets, Switzerland (11-12 May 2013): Strongly correlated superconductivity, pseudogap and Mott transition
3. Invited talk, *Topology, Correlations and Interfaces in Quantum Matter Conference*, Orsay, France (15-19 September 2013): Strongly correlated superconductivity, pseudogap and Mott transition
2. Invited talk, *Journées de la Matière condensée*, Montpellier, France (27-31 August 2012): Mott physics in cuprates: insights from cluster dynamical mean-field theory
1. Invited talk, *American Physical Society March Meeting 2011*, Dallas, US (21-25 March 2011): Finite doping signatures of the Mott transition in the two-dimensional Hubbard model

CONTRIBUTED PRESENTATIONS SINCE 2011

21. Contributed talk, *American Physical Society March Meeting 2021*, Online (14-19 March 2021): Entanglement and classical correlations at the doping-driven Mott transition in the two-dimensional Hubbard model
20. Contributed talk, *American Physical Society March Meeting 2021*, Online (14-19 March 2021): Critical opalescence across the doping-driven Mott transition in the two-dimensional fermionic Hubbard model
19. Seminar, *Collège de France*, Paris, France (31 January 2018): Effects of interaction strength, doping, and frustration on the antiferromagnetic phase of the two-dimensional Hubbard model

18. Contributed talk, *Frontiers in Condensed Matter Physics*, Bristol, UK (11-12 January 2018): Effects of interaction strength, doping, and frustration on the antiferromagnetic phase of the two-dimensional Hubbard model
17. Contributed talk, *Congress of the Italian Physical Society*, Trento, Italy (11-15 September 2017): An organizing principle for two-dimensional strongly correlated superconductivity
16. Seminar, *Institut für Theoretische Physik*, Frankfurt, Germany (23 June 2017): Revealing signatures of Mott physics in cuprate superconductors
15. Seminar, *Physics Department, Université de Sherbrooke*, Sherbrooke, QC, Canada (24 May 2017): Revealing signatures of Mott physics in cuprate superconductors
14. Seminar, *Rudolf Peierls Centre for Theoretical Physics*, Oxford, UK (20 January 2016): Remnant of the first-order Mott transition at finite doping as an organizing principle for strongly correlated superconductors
13. Contributed talk, *Materials and Mechanisms of Superconductivity 2015*, Geneva, Switzerland (23-28 August 2015): Mott physics in the three-band model of the CuO₂ plane
12. Contributed talk, *Oxford symposium on quantum materials*, Somerville College, Oxford, UK (1 May 2015): Remnant of the first-order Mott transition at finite doping as an organizing principle for strongly correlated superconductors
11. Seminar, *Physics Department, Université de Sherbrooke*, Sherbrooke, QC, Canada (12 March 2014): Mott physics in the three-band model of the high-temperature superconductors
10. Contributed talk, *American Physical Society March Meeting 2014*, Denver, USA (3-7 March 2014): Mott-Hubbard vs Charge-Transfer Insulating Behavior in the CuO₂ Plane
9. Seminar, *Imperial College, London*, London, UK (1 May 2013): Mott physics in cuprates: insights from cluster dynamical mean-field theory
8. Contributed talk, *American Physical Society March Meeting 2013*, Baltimore, USA (18-22 March 2013): c-axis resistivity, pseudogap, superconductivity and Widom line in doped Mott insulators
7. Seminar, *Physics Department, Université de Sherbrooke*, Sherbrooke, QC, Canada (16 March 2013): Mott physics in cuprates: insights from cluster dynamical mean-field theory
6. Seminar, *ISIS - Rutherford Laboratory*, Rutherford Laboratory, Didcot, UK (12 March 2013): Mott physics in cuprates: insights from cluster dynamical mean-field theory
5. Contributed talk, *Journées de la Matière condensée*, Montpellier, France (27-31 August 2012): a-y transition in cerium revisited
4. Seminar, *Institut Laue-Langevin*, Grenoble, France (30 March 2012): Mott physics in cuprates: insights from cluster dynamical mean-field theory
3. Contributed talk, *American Physical Society March Meeting 2012*, Boston, USA (27 February - 2 March 2012): Pseudogap temperature along the Widom line of a first-order transition in doped Mott insulators
2. Seminar, *Laboratoire de Physique des Solides*, Orsay, France (9 February 2012): Strong coupling superconductivity, pseudogap and Mott transition
1. Contributed talk, *Seminaire Dautreppe 2011*, Grenoble, France (21-25 November 2011): Mott physics in high-temperature superconductors

FELLOWSHIPS

Visiting Fellowship at the “Institut quantique”, 2019 - 2022
 Université de Sherbrooke, Sherbrooke, QC, Canada

Aurelio Beltrami Fellowship for young researchers’ studies abroad, 2004 - 2005
 Fondazione Aurelio Beltrami, Italy (fondazioneaureliobeltrami.org).
 Fellowship to study for the Diplôme d’études approfondies de physique des solides et milieux denses,
 Ecole Doctorale de la Région Parisienne, France

GRANTS

10. **Co-investigator**, Workshop grant for organising an international research conference in condensed matter at Bedford Square, London (“Condensed Matter Physics in the City 2020”), *Institute for Complex Adaptive Matter, USA* (2020)
9. **Co-investigator**, Grant for organising a 2-day international research workshop on “New avenues for emergence in out-of- equilibrium matter” as part of the Condensed Matter Physics in the City 2019, *EPSRC Network Plus: Emergence and Physics Far From Equilibrium, UK* (2019)
8. **Principal Investigator**, Grant for organising an international research conference at Bedford Square, London (“Condensed Matter Physics in the City 2019”), *Institute of Physics* (2019)
7. **Principal Investigator**, Workshop grant for organising an international research conference in condensed matter at Bedford Square, London and ESPCI, Paris (“Condensed Matter Physics in the Cities 2019”), *Institute for Complex Adaptive Matter, USA* (2019)
6. **Principal Investigator**, Award for organising a 1-day international research workshop on “Big Questions in Quantum Materials” at Royal Holloway, as part of the “Condensed Matter Physics in the City 2018” international research conference, *Nature, UK* (2018)
5. **Principal Investigator**, Workshop grant for organising an international research conference in condensed matter at Bedford Square, London (“Condensed Matter Physics in the City 2018”), *Institute for Complex Adaptive Matter, USA* (2018)
4. **Principal Investigator**, Workshop grant for organising an international research conference in condensed matter at Bedford Square, London (“Condensed Matter Physics in the City 2017”), *Institute for Complex Adaptive Matter, USA* (2017)
3. **Principal Investigator**, Workshop grant for organising an international research conference in condensed matter at Bedford Square, London (“Condensed Matter Physics in the City 2016”), *Institute for Complex Adaptive Matter, USA* (2016)
2. **Principal Investigator**, Workshop grant for organising an international research conference in condensed matter at Bedford Square, London (“Condensed Matter Physics in the City 2015”), *Institute for Complex Adaptive Matter, USA* (2015)
1. **Principal Investigator**, Workshop grant for organising an international research conference in condensed matter at Bedford Square, London (“Condensed Matter Physics in the City 2014”), *Institute for Complex Adaptive Matter, USA* (2014)

ORGANISATION OF CONFERENCES

16. **Lead organiser**, *Condensed Matter Physics in the Cities 2019*, Bedford Square, London; Royal Holloway campus; Rutherford Appleton Laboratory; ESPCI (France), 1-5 July 2019, 8- 11 July 2019, and 15- 16 July 2019 (about 50 participants per week)

15. Organiser, *New avenues for emergence in out- of-equilibrium matter, a 2-day workshop as part of the Condensed Matter Physics in the Cities 2019 conference*, Bedford Square, London, 1-2 July 2019 (about 40 participants per week)
14. Lead organiser, *Condensed Matter Physics in the City 2018*, Bedford Square, London; Royal Holloway campus; Rutherford Appleton Laboratory, 11 - 22 July 2018 (about 40 participants per week)
13. Co-organiser, *Theoretical and Experimental Magnetism Meeting 2018*, Abingdon, UK, 23-25 July 2018 (about 70 participants)
12. Organiser, *1st ISIS-TYC Science Meeting 2017*, Abingdon, UK, 26-27 July 2017 (about 50 participants)
11. Lead organiser, *Condensed Matter Physics in the City 2017*, Bedford Square, London; Royal Holloway campus; Rutherford Appleton Laboratory, 7 - 14 July 2017 (about 40 participants per week)
10. Co-organiser, *Theoretical and Experimental Magnetism Meeting 2017*, Abingdon, UK, 4-6 June 2017 (about 70 participants)
9. Lead organiser, *Condensed Matter Physics in the City 2016*, Bedford Square, London; Royal Holloway campus; Rutherford Appleton Laboratory, 4 - 15 July 2016 (about 40 participants per week)
8. Co-organiser, *Theoretical and Experimental Magnetism Meeting 2016*, Abingdon, UK, 16-17 June 2016 (about 70 participants)
7. Lead organiser, *Condensed Matter Physics in the City 2015*, Bedford Square, London; Royal Holloway campus; Rutherford Appleton Laboratory, 22 June - 3 July 2015 (about 40 participants per week)
6. Co-organiser, *Theoretical and Experimental Magnetism Meeting 2015*, Abingdon, UK, 16-17 July 2015 (about 70 participants)
5. Lead organiser, *Condensed Matter Physics in the City 2014*, Bedford Square, London; Royal Holloway campus; UCL; Rutherford Appleton Laboratory, 3-19 June 2014 (about 40 participants per week)
4. Co-organiser, *Theoretical and Experimental Magnetism Meeting 2014*, Abingdon, UK, 2-3 July 2014 (about 70 participants)
3. Lead organiser, *Condensed Matter Physics in the City 2013*, Bedford Square, London; Royal Holloway campus; UCL; Rutherford Appleton Laboratory, 10 June - 5 July 2013 (about 40 participants per week)
2. Lead organiser, *Hubbard Theory Consortium Summer Programme Special Event: 50th anniversary of Hubbard model*, UCL, London, 18 June 2013 (about 150 participants)
1. Lead organiser, *Symposium in honour of Philippe Nozières' 80th Birthday*, Institut Laue-Langevin, Grenoble, 21 May 2012 (about 100 participants)

PHD STUDENTS SUPERVISION

I have supervised 2 PhD students, as sole supervisor. Furthermore, I have been second supervisor (i.e. "advisor" role) for 3 PhD students.

2. **PhD supervisor**, Caitlin Walsh, Royal Holloway, University of London, since 2019
Thesis title: Entanglement in quantum many-body systems across the Mott transition (ongoing PhD thesis project)
1. **PhD supervisor**, Lorenzo Fratino, Royal Holloway, University of London, 2013 - 2017
Thesis title: Antiferromagnetism, superconductivity, pseudogap and their Interplay with the Mott transition

PHD EXAMINING

I have been PhD examiner for 5 PhD theses.

5. Internal examiner, Royal Holloway, University of London (Saeed Ascroft, *Thesis title: Typicality, dynamics, and unconventional stationary states of an embedded quantum system*, 2020)
4. External examiner, SISSA, Trieste, Italy (Francesco Grandi, *Thesis title: Mott insulators in disguise*, 2018)
3. External examiner, Université Paris-Sud, Orsay, France (Manali Vivek, *Thesis title: Topological states at the surfaces and interfaces of perovskite metal oxides*, 2018)
2. External examiner, The Institute of Mathematical Sciences, Chennai, India (Prosenjit Haldar, *Study of Quantum Transport at the Metal-Insulator Transition in Falicov-Kimball Model within Alloy Analogy*, 2017)
1. Internal examiner, King's College London (David J. Blackburn, *Thesis title: An investigation into self assembled super-lattices of strongly correlated adatoms on metallic surfaces through the use of Dynamical Mean Field Theory*, 2017)

TEACHING**TEACHING ACHIEVEMENTS**

Certificate in Academic Practice in Teaching and Learning, 2016
Royal Holloway, University of London, UK

Fellow of the Higher Education Academy, since 2016
The Higher Education Academy, UK (www.heacademy.ac.uk)

BREATH OF TEACHING EXPERIENCE

I have been doing **large-group teaching** as sole instructor (3 different undergraduate courses and 2 different PhD courses); **laboratory teaching** as sole instructor (computational laboratory); **small-group teaching** (weekly meetings with 2 groups of 3-5 students in their 1st or 2nd year, weekly meeting for mini-research project for 3rd year students).

In addition, I've been doing **one-on-one supervision** of 14 MSc/BSc finalists on research projects, 3 internship students, and 2 PhD students.

Furthermore, I've been reviewer and examiner for MSc/BSc projects, including VIVA examinations for MSc/BSc finalists. I've also been 1st and 2nd marker for undergraduate exams.

POSTGRADUATE COURSES TAUGHT

3. Introductory concepts to the Hubbard model (**course leader**, individually taught course), 5-17 August 2019 (6 contact hours)
PhD course at the Summer School on Emergent Phenomena in Correlated Quantum Matter
Institut d'Etudes Scientifiques, Cargèse, France
Course webpage: personal.rhul.ac.uk/uxap/009/cargese2019.html

2. Introduction to path integrals (**course leader**, individually taught course) 2017 - 2018 (11 contact hours)
PhD course, Department of Physics, Royal Holloway, University of London, UK
Course webpage: personal.rhul.ac.uk/uxap/009/pi.html

1. Introduction to dynamical mean-field theory (1.5 contact hours)
Lecture in the PhD course “Numerical methods in physics”, Université Joseph Fourier, Grenoble, France

UNDERGRADUATE COURSES TAUGHT

Large-group teaching

9. PH3150 Further Mathematical Methods (**course leader**, individually taught course), 2020 - 2021
Third year undergraduate course (30 students, 35 contact hours)
8. PH3710 Metals and Semiconductors (**course leader**, individually taught course), 2020 - 2021
Third year undergraduate course (17 students, 35 contact hours)
7. PH3150 Further Mathematical Methods (**course leader**, individually taught course), 2019 - 2020
Third year undergraduate course (13 students, 35 contact hours)
6. PH3710 Metals and Semiconductors (**course leader**, individually taught course), 2019 - 2020
Third year undergraduate course (7 students, 35 contact hours)
5. PH2210 Quantum mechanics (**course leader**, individually taught course), 2018 - 2019
Second year undergraduate course (36 students, 35 contact hours)
4. PH2210 Quantum mechanics (**course leader**, individually taught course), 2017 - 2018
Second year undergraduate course (39 students, 35 contact hours)
3. PH2210 Quantum mechanics (**course leader**, individually taught course), 2016 - 2017
Second year undergraduate course and example classes (49 students, 46 contact hours)
2. PH2210 Quantum mechanics (**course leader**, individually taught course), 2015 - 2016
Second year undergraduate course (55 students, 35 contact hours)
1. PH2210 Quantum mechanics (**course leader**, individually taught course), 2014 - 2015
Second year undergraduate course (53 students, 35 contact hours)

Laboratory

2. PH2210 Quantum Mechanics Computational Lab (**course leader**, individually taught course), 2018 - 2019
Second year undergraduate course (36 students, 11 contact hours)
1. PH2210 Quantum Mechanics Computational Lab (**course leader**, individually taught course), 2017 - 2018
Second year undergraduate course (39 students, 11 contact hours)

Small-group teaching

13. PH3010 Scientific skills for MSci - Module: “The Hubbard model from A to B”, 2020 - 2021
Third year undergraduate module (3 students, 6 contact hours)
12. Small group teaching for 2nd year undergraduates (weekly “tutorials”), 2020 - 2021
(2 groups of 4 and 5 students each, 33 contact hours)
11. PH3010 Scientific skills for MSci - Module: “The Hubbard model from A to B”, 2019 - 2020
Third year undergraduate module (1 student, 6 contact hours)

10. Small group teaching for 2nd year undergraduates (weekly “tutorials”), 2019 - 2020
(2 groups of 4 and 5 students each, 44 contact hours)
9. PH3010 Scientific skills for MSci - Module: “The Hubbard model from A to B”, 2018 - 2019
Third year undergraduate module (3 students, 6 contact hours)
8. Small group teaching for 1st and 2nd year undergraduates (weekly “tutorials”), 2018 - 2019
(2 groups of 3 and 3 students each, 44 contact hours)
7. PH3010 Scientific skills for MSci - Module: “The Hubbard model from A to B”, 2017 - 2018
Third year undergraduate module (4 students, 6 contact hours)
6. Small group teaching for 2nd year undergraduates (weekly “tutorials”) 2017 - 2018
(2 groups of 3 and 3 students each, 44 contact hours)
5. PH3010 Scientific skills for MSci - Module: “The Hubbard model from A to B”, 2016 - 2017
Third year undergraduate module (2 groups of 2 and 3 students each, 12 contact hours)
4. Small group teaching for 2nd year undergraduates (weekly “tutorials”), 2016 - 2017
(2 groups of 3 and 3 students each, 44 contact hours)
3. Small group teaching for 2nd year undergraduates (weekly “tutorials”), 2015 - 2016
(2 groups of 4 and 4 students each, 44 contact hours)
2. Small group teaching for 2nd year undergraduates (weekly “tutorials”), 2014 - 2015
(2 groups of 3 and 3 students each, 44 contact hours)
1. Small group teaching for 1st year undergraduates (weekly “tutorials”), 2013 - 2014
(1 group of 4 students, 22 contact hours)

OTHER TEACHING

3. Broken symmetries and coherent states (**teaching assistant**), 2010 (62 hours)
PhD/Master course, Département de Physique, Université de Sherbrooke, QC, Canada
2. Broken symmetries and coherent states (**teaching assistant**), 2009 (62 hours)
PhD/Master course, Département de Physique, Université de Sherbrooke, QC, Canada
1. Advanced solid state physics (**teaching assistant**), 2009 (62 hours)
Master course, Département de Physique, Université de Sherbrooke, QC, Canada

UNDERGRADUATE STUDENTS SUPERVISION

I have supervised 14 MSc/BSc finalists on research projects and 5 internship students at the Department of Physics, Royal Holloway, University of London, UK.

5. **Supervisor of 5 Master students** for MSc major projects: Frank Elson (2021), Jonathan Mitchell (2020), Caitlin Walsh (2019), Bailey Cook (2017), Leo Carlos-Sandberg (2016)
4. **Supervisor of 5 Master students** for MSc research review projects: Adam Strong (2021), Karl Brown (2019), George Thomas (2019), Dominic Murphy (2017), Sarah Allen (2014)
3. **Supervisor of 4 Bachelor students** for BSc major research projects: Emir Pinto (2021), Azzurra Sisi (2019), Hassan Al-sadiq (2017), Shivan Malde (2016)
2. **Supervisor of 3 internship students**: Caitlin Walsh (2018), Ciara Mackellar (2016), Bailey Cook (2015)

1. **Co-supervisor of 1 international visiting student** (with Prof. André-Marie Tremblay): Olivier Simard from University of Sherbrooke, Canada (4 months visiting internship in 2018, thanks to the “Institute for Complex Adaptive Matter (ICAM) exchange award” between two ICAM branches and to “MITACS Globalink research award”)

EXTERNAL ENGAGEMENT / IMPACT

I have been the leading organiser for 3 science outreach events associated with the annual international research conference in condensed matter (“Condensed Matter in the City”).

3. “Les trois plus belles expériences quantiques!”. Evening lecture by Prof. Julien Bobroff, Université Paris-Sud, France; Ecole Normale Supérieure, Paris, France, 10 July 2019

2. “Quantum Technology - Challenges and Opportunities”. Evening Lecture by Prof. Seamus Davis, University of Oxford, UK; Royal Holloway, University of London, UK, 4 July 2019

1. An evening with Physics and Music: Evening Lecture “The dark energy of quantum materials” by Prof. Laura Greene, Florida State University, USA and Classical music piano performance by Prof. Ian Hobson; Royal Holloway, University of London, UK, 14 June 2018

ADMINISTRATION

SYNERGISTIC ACTIVITIES

Referee for APS journals, Science Advances, EPSRC, SNSF, Cambridge University Press, etc.

INTERNAL POSITIONS OF RESPONSIBILITY

Chair of the Equality and Diversity committee, since 2018
Department of Physics, Royal Holloway, University of London, UK

Teaching Team leader of Third Year undergraduate courses, since 2019
Department of Physics, Royal Holloway, University of London, UK

Member of the Physics Departmental Committee, since 2013
Department of Physics, Royal Holloway, University of London, UK

Member of the Students-Staff Committee, since 2018
Department of Physics, Royal Holloway, University of London, UK

College secretary of the Theory Group at the Institut Laue-Langevin, 2011 - 2012
Institut Laue-Langevin, Grenoble, France

MEMBERSHIPS, AFFILIATIONS, OTHER APPOINTMENTS

Member of the American Physical Society (www.aps.org) since 2008

Member of the Italian Physical Society (en.sif.it) since 2017

Fellow of The Higher Education Academy (www.heacademy.ac.uk) since 2016

External Collaborator of Compute Canada (www.computecanada.ca) since 2016

Date

31 May 2021

Place

Soresina