

Valentina Ros | CV

Last update: January 2024

Employment

- **LPTMS- Laboratoire de Physique Théorique et Modèles Statistiques Orsay, France**
Chargé de Recherche, CNRS - University Paris-Saclay 2020–current
- **Laboratoire de Physique, École Normale Supérieure** Paris, France
Junior Researc Chair, Independent Post-Doc position 2019–2020
- **Laboratoire de Physique Statistique, École Normale Supérieure** Paris, France
Post-Doc position, Mentor: Prof. G. Biroli 2018–2019
- **Institut de Physique Théorique, CEA/Saclay** Paris, France
Post-Doc position, Mentor: Prof. G. Biroli 2016–2018

Education

Academic Qualifications.....

- **SISSA- International School for Advanced Studies** Trieste, Italy
Ph.D. in Statistical Physics 2012–2016
- **Ludwig Maximilians Universität** München, Germany
TMP-Elite Master in Theoretical and Mathematical Physics 2010 - 2012
- **Università degli Studi di Trieste** Trieste, Italy
Bachelor in Physics 2007 - 2010

Theses.....

- **Ph.D. Thesis:** *Aspects of localization in disordered many-body quantum systems*
Advisors: Dr. Markus Mueller and Dr. Antonello Scardicchio
Approved *cum laude*
- **Master Thesis:** *On the Lifshitz tails phenomenon for the density of states of Anderson Hamiltonians on trees*
Advisor: Prof. Dr. Simone Warzel
ECTS-Grade: A, Passed *with high distinction*
- **Bachelor Thesis:** *Collasso della funzione d'onda e relatività*
Advisor: Dr. Angelo Bassi
Final Grade: 110/110 *cum laude and president awards honors*

Awards

- **Early Career Researcher Best Paper Prize 2022** of the Journal of Physics A: Mathematical and Theoretical. Paper: V.Ros, *Distribution of rare saddles in the p -spin energy landscape*, J. Phys. A: Math. Theor. 53 12500 (2020).
- **EPS Statistical and Nonlinear Physics Early Career Prize 2019** of the European Physical Society.
- **Distinguished referee 2016** of EPJ-The European Physical Journal.

Funding and fellowships

- 2022 - **Projets Fil de l'eau visiteur, Investissements d'Avenir du LabEx PALM**
Project: GlassMan, with Elisabeth Agoritsas
- 2021 - **Chaire junior interne, Investissements d'Avenir du LabEx PALM**
Project: HighDyn
- 2020 - **Prime d'encadrement doctoral et de recherche (PEDR)**
- 2019 - **Marie Skłodowska-Curie Individual Fellowship** (*declined*)
Project: HighDLands
- 2019 - **Junior Research Chair fellowship** (*accepted*) at École Normale Supérieure
- 2012 - **PhD fellowships in Statistical Physics** (*accepted*) at International School for Advanced Studies
- 2012 - **PhD fellowships in Mathematical Physics** (*declined*) at International School for Advanced Studies

Supervision

- From November 2022: **Doctorat** of A. Pacco, co-supervised with A. Rosso
- Spring 2022: **Research internship** of A. Pacco, enrolled in the master of fundamental physics of ICFP-International Centre for Fundamental Physics
- Spring 2024: **Research Internship** of T. Roy, enrolled in the master Physique Fondamentale et Applications of Sorbonne Université.

Teaching and courses

Regular teaching at masters.....

- Spring 2024 - **Lectures and exercises (9 sessions per year)** for the course *Statistical Physics of Disordered Systems*, M2 of ICFP Master, Paris (with A. Rosso).

- Spring 2020, 2021, 2022, 2023 – **Exercise sessions (9 sessions per year)** for the course *Complex systems: from physics to social sciences*, M2 of ICFP Master, Paris (Lecturer: Prof. J. P. Bouchaud).

Advanced courses at PhD schools.....

- March 2023 – **Lectures (2 hours)** on *Eigenstate Thermalization Hypothesis, and its violations*, Dynamical Foundations of Many-Body Quantum Chaos, Institut Pascal, Orsay (France).
- February 2022 – **Lectures (6 hours)** on *An introduction to (Many-Body) Localization*, Statistical Field Theory school, Galileo Galilei Institute, Florence (Italy).
- October 2021 – **Lectures (2 hours)** on *High-dimensional counting problems and random matrix theory*, École d'automne du GDR MEGA, Saint-Malo (France).
- September 2020 – **Lectures (4 hours)** on *The basics of many body localization*, School on Clean and Disordered Systems Out-of-Equilibrium, Institut d'Études Scientifiques de Cargèse, Corse (France).
- Winter 2019 – **Teaching assistant** for the course *Statistical Physics: Concepts and Applications*, ICFP Master at École Normale Supérieure, Paris (Lecturer: Prof. W. Krauth).

Organization of Scientific Events

- **Steering committee** *StatPhys29- The 29th international conference on statistical physics* to be held in Florence (Italy) on July 13-18, 2025.
- **Co-organizer of the Workshop** *From Machine-Learning Theory to Driven Complex Systems and back* to be held in CECAM, Lausanne (Switzerland) on 22-24 May 2024.
- **Co-organizer of the Conference** *Journées Interdisciplinaires de Physique Statistique* held in Orsay (France) on 30-31 March 2023.
- **Co-organizer of the School** *Interdisciplinary Challenges: from Non-equilibrium Physics to Life Sciences* held in Edinburgh (UK) on 25-29 April 2022.
- **Organizer of weekly seminars** of the LPTMS (from September 2021).
- **Co-organizer of seminars** of the Forum of Statistical Physics at École Normale Supérieure (2019-2020)

Scientific talks, seminars and posters

Invited talks at conferences and seminars.....

- 12/2023- **XIX Brunel - Bielefeld Workshop on Random Matrix Theory and Applications** , Zif Bielefeld, Germany.
- 11/2023- **MEGA (Matrices et Graphes Aléatoires) Seminar**, Paris, France.
- 09/2023- **Disordered Systems Days**, KCL London, Uk.
- 07/2023- **Quantum Localization and Glassy Physics**, Cargese, Corse.
- 06/2023- **High Dimensional Statistics and Random Matrices**, Porquerolles, France.
- 04/2023- **CEA Artificial Intelligent Chair seminar**, Saclay, France.
- 01/2023- **FRESK Quantitative Biology seminar**, Paris, France.
- 11/2022- **1ères Journées du GDR Interaction Désordre Élasticité**, Grenoble, France.
- 11/2022- **Ergodicity breaking and integrability in long-range systems and on random graphs**, Stockholm, Sweden.
- 10/2022- **Wave Localization and Many-Body Localization in Quantum Information**, Cargese, Corse.
- 10/2022- **Two days with Giorgio Parisi in Paris** , Paris, France.
- 09/2022- **Universal Structures in Probabilistic Models** , Cologne, Germany.
- 05/2022- **Statistical Physics and Low-D Systems**, Pont-a-Mousson, France.
- 04/2022- **IPhT - Lptms Stat Phys Day**, CEA Saclay, France.
- 03/2022- **Simons Cracking the Glass Problem annual meeting**, Simons Foundation, New York.
- 02/2022- **Statistical Physics and Complexity Webinar Series**, The University of Edinburgh, Scotland (*online talk*).
- 12/2021- **SIFS Plenary colloquium**, Società Italiana di Fisica Statistica, Italy (*online talk*).
- 12/2021- **29th Colloque Alain Bouyssy**, Paris Saclay University, France.
- 11/2021- **Random Matrices, Physics and Machine Learning**, ENS Center for Data Sciences, France.
- 09/2021- **News from disordered elastic systems**, Anargyrios & Korgialenios School of Spetses, Greece.
- 07/2021- **Glassy Systems and Inter-Disciplinary Applications**, Institut d'Études Scientifiques de Cargèse, Corse.

- 05/2021- **Joint ICTP-SISSA statistical physics seminar**, International School for Advanced Studies, Trieste, Italy (*online talk*).
- 04/2021- **Interdisciplinary Challenges in Nonequilibrium Physics**, Erwin Schroedinger Institute, University of Vienna, Austria (*online talk*).
- 03/2021- **Physics colloquium**, Emory University, Atlanta, Georgia (*online talk*).
- 01/2021 - **Séminaire du LPTMS**, Laboratoire de Physique Théorique et Modèles Statistiques, Orsay, France (*online talk*).
- 01/2021- **Recent advances on the glass problem**, Cecam digital meeting, Lausanne, Switzerland (*online talk*).
- 11/2020 - **GSSI-TNT-Sapienza Statistical Mechanics Webinars**, Gran Sasso Science Institute and Università La Sapienza, L'Aquila and Rome, Italy (*online talk*).
- 07/2020- **Youth in High-dimensions: Machine Learning, High-dimensional Statistics and Inference for the New Generation**, ICTP-Abdus Salam International Center for Theoretical Physics, Trieste, Italy (*online talk*).
- 05/2020 - **Probability and Stats seminar**, Department of Mathematics and Computer Science, Basel University, Basel, Switzerland (*online talk*).
- 04/2020 - **Séminaire MSC**, Laboratoire Matière et Systèmes Complexes, Paris Diderot, Paris, France (*online talk*).
- 12/2019 - **CANES seminar**, King's College London, London, United Kingdom.
- 10/2019 - **Séminaire LPTMC**, Laboratoire de Physique Théorique de la Matière Condensée, Sorbonne Université, Paris, France.
- 11/2019- **1st French-German meeting in Physics, Mathematics and Artificial Intelligence**, Centre culturel Irlandais, Paris, France.
- 10/2019 - **Statistical Physics Forum**, Département de Physique, École Normale Supérieure, Paris, France.
- 09/2019- **40 years of Replica Symmetry Breaking**, La Sapienza University, Rome, Italy.
- 09/2019- **Quantum and physics based machine learning workshop**, DALI 2019, San Sebastian, Spain.
- 06/2019- **Breakdown Of Ergodicity In Isolated Quantum Systems: From Glassiness To Localization**, Galileo Galilei Institute, Firenze, Italy.
- 05/2019- **Statistical Physics of Complex Systems**, Nordita, Stockholm, Sweden.
- 03/2019- **APS March Meeting 2019**, Boston Convention and Exhibition Center, Boston, Massachusetts.
- 02/2019 - **Seminar at "the Rough High-Dimensional Landscape Problem" program**, Kavli Institute for Theoretical Physics, University of California, Santa Barbara,

California.

- 02/2019- **Séminaire de Physique Mathématique/Physique Statistique**, Laboratoire de Physique Theorique et Hautes Energies, Sorbonne Université, Paris, France.
- 11/2018- **Condensed Matter and Nanoscience Seminar**, School of Physics and Astronomy, Nottingham, United Kingdom.
- 10/2018- **Séminaire du LPTMS**, Laboratoire de Physique Théorique et Modèles Statistiques, Orsay, Paris, France.
- 04/2018- **High Dimensional Dynamics Conference**, The CUNY Graduate Center, New York City, New York.
- 01/2018- **Statistical Physics Seminar**, IPhT-Institut de Physique Théorique CEA/Saclay, Paris, France.
- 12/2017- **NYU Probability and Mathematical Physics seminar**, Courant Institute, New York City, New York.
- 07/2017- **Many-Body-Localization: Advances in the Theory and Experimental Progress**, ICTP-Abdus Salam International Center for Theoretical Physics, Trieste, Italy.
- 02/2017- **Trieste Quantum Days 2017**, SISSA- International School for Advanced Studies, Trieste, Italy.
- 05/2016- **Analysis, Math-Phys, and Quantum seminar**, SISSA- International School for Advanced Studies, Trieste, Italy.
- 03/2016- **Quantum 2016**, ICTP-Abdus Salam International Center for Theoretical Physics, Trieste, Italy.
- 06/2015- **Spring college on the physics of complex systems**, ICTP-Abdus Salam International Center for Theoretical Physics, Trieste, Italy.
- 09/2014- **Theoretical condensed matter seminar**, Basel University, Basel, Switzerland.

Contributed talks and posters.....

- 10/2021- **Ergodicity Breaking and Anomalous Transport in Quantum Many-Body Systems [talk]**, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany.
- 06/2021- **Stochastic Models and Experiments in Ecology and Biology [talk]**, European Center of Living Technology, Venice, Italy.
- 03/2019- **Simons Collaboration on Cracking the Glass Problem Annual Meeting [poster]**, Simons Foundation, New York City, New York.
- 06/2018- **Unifying concepts in glass physics VII [talk]**, University of Bristol, Bristol, United Kingdom.

- 09/2018- **Disordered serendipity: a glassy path to discovery [poster]**, La Sapienza University, Rome, Italy.
- 03/2017- **Simons Collaboration on Cracking the Glass Problem Annual Meeting [poster]**, Simons Foundation, New York City, New York.
- 03/2015- **Many-Body dynamics out of equilibrium [poster]**, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany.

Science Dissemination

- 12/2022 - Seminar for the course "Comunicare la fisica e la matematica" at the Master in Scientific communication Franco Prattico, SISSA, Trieste, Italy.

Other working activities

Editing and refereeing.....

- **Editor** of JSTAT - Journal of Statistical Mechanics: Theory and Experiment
- **Referee** for the following scientific journals:
 - PRL - Physical Review Letters
 - PRB - Physical Review B
 - PRE - Physical Review E
 - Physical Review Research
 - EPJ-The European Physical Journal
 - Quantum - the open journal for quantum science
 - EPL - Europhysics letters
 - Journal of Physics A: Mathematical and Theoretical
 - Physica A: Statistical Mechanics and its Applications
 - JSP - Journal of Statistical Physics
 - Scipost Physics

Participation to juries.....

- **Jury member** (examinateur) of 6 PhD defenses: T. Arnoulx De Pirey (Université de Paris, 2021), M. Ouerfelli (Université Paris Saclay, 2022), I. Akjouj (Université de Lille, 2023), E. Mauri (Université PSL, 2023), L. Gan (Université Paris Saclay, 2023), J. Garnier-Brun (Institut Polytechnique, 2023).
- **Jury member** of Master Internship Reports of École Normale Supérieure - Paris (1 in 2019, 4 in 2020, 4 in 2022, 5 in 2023) and of École Normale Supérieure - Paris Saclay (2 in 2021).
- Member of **Comité de suivi** of Li Gan, Jules Givois, Leo Tuozo.

Scientific councils.....

- Member of **Conseil de Laboratoire** of LPTMS (since 2022).
- Nominated member of **Conseil Scientifique [Physique] of UFR Sorbonne University** (2022-2026).
- Member of **Comité experts Statistiques** of Délégation Ile-de-France Villejuif (2021).

Publication List

- **Curvature-driven pathways interpolating between stationary points: the case of the pure spherical 3-spin model**
A. Pocco, G. Biroli, V. Ros, J. Phys. A: Math. Theor. Letters 57, 07LT01 (2024).
- **Overlaps between eigenvectors of spiked, correlated random matrices**
A. Pocco, V. Ros, Phys. Rev. E 108, 024145 (2023).
- **The high-d landscapes paradigm: spin-glasses, and beyond**
V. Ros, Y. V. Fyodorov, Contribution to the book Spin Glass Theory and Far Beyond: Replica Symmetry Breaking after 40 Years, World Scientific (2023) [*Review paper.*]
- **Quenched complexity of equilibria for asymmetric Generalized Lotka-Volterra equations**
V. Ros, F. Roy, G. Biroli, G. Bunin, J. Phys. A: Math. Theor. 56, 305003 (2023)
- **Generalized Lotka-Volterra equations with random, non-reciprocal interactions: the typical number of equilibria**
V. Ros, F. Roy, G. Biroli, G. Bunin, A. M. Turner, Phys. Rev. Lett. 130, 257401 (2023)
- **Fluctuation driven transitions in localized insulators: Intermittent metallicity and path chaos precede delocalization**
V. Ros, M. Mueller, Physical Review B 104, 094205 (2021). [*Editors' suggestion.*]
- **Dynamical Instantons and Activated Processes in Mean-Field Glass Models**
V. Ros, G. Biroli, C. Cammarota, SciPost Phys. 10, 002 (2021)
- **Distribution of rare saddles in the p -spin energy landscape**
V. Ros, Journal of Physics A: Mathematical and Theoretical 53 (12), 125002 (2020)
- **Anderson transition on the Bethe lattice: an approach with real energies**
G. Parisi, S. Pascazio, F. Pietracaprina, V. Ros, A. Scardicchio, Journal of Physics A: Mathematical and Theoretical 53 (1), 014003 (2020)
- **Complexity of energy barriers in mean-field glassy systems**
V. Ros, G. Biroli, C. Cammarota, EPL (Europhysics Letters) 126, vol. 2 (2019)
- **Complex energy landscapes in spiked-tensor and simple glassy models: ruggedness, arrangements of local minima and phase transitions**

- V. Ros, G. Ben Arous, G. Biroli, C. Cammarota, Phys. Rev. X. 9, 011003 (2019)
- **Remanent magnetization: signature of Many-Body Localization in quantum antiferromagnets**
V. Ros, M. Müller, Phys. Rev. Lett. 118, 237202 (2017)
 - **Local integrals of motion in many-body localized systems**
J. Imbrie, V. Ros, A. Scardicchio, Annalen der Physik 529, 1600278 (2017) [Review paper.]
 - **The forward approximation as a mean field approximation for the Anderson and Many Body Localization transitions**
F. Pietracaprina, V. Ros, A. Scardicchio, Phys. Rev. B 93, 054201 (2016)
 - **Localized systems coupled to small baths: From Anderson to Zeno**
D. Huse, R. Nandkishore, F. Pietracaprina, V. Ros, A. Scardicchio, Phys. Rev. B 92, 014203 (2015)
 - **Integrals of motion in the Many-Body Localized phase**
V. Ros, M. Müller, A. Scardicchio, Nuclear Physics B 891, 420 (2015)