Claudia Rella

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Institut des Hautes Études Scientifiques (IHES)
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EMPLOYMENT

Postdoctoral Researcher in Mathematical Physics — from Oct 2024
Institut des Hautes Études Scientifiques (IHES), France
Affiliations: Huawei Young Talents Program

EDUCATION

Ph.D. in Mathematical Physics – Très Bien (highest honours) — 2020 – 2024
Department of Theoretical Physics, University of Geneva, Switzerland
Thesis: *On the arithmetic of resurgent topological strings*. Supervised by Prof. Marcos Mariño
Affiliations: ERC SyG ReNewQuantum and NCCR SwissMAP

M.Sc. in Mathematical and Theoretical Physics – Distinction (highest honours) — 2018 – 2019
Mathematical Institute and Department of Physics, University of Oxford, UK
Thesis: *Motivic amplitudes*. Supervised by Prof. Francis Brown
Affiliations: St John's College

B.Sc. in Physics (*) – Summa cum Laude (highest honours) — 2015 – 2018
Department of Physics, Sapienza University of Rome, Italy
Thesis: *Photonic Bloch waves*. Supervised by Prof. Fabio Sciarrino
(*): Extra-curricular coursework in Mathematics at the Department of Mathematics

INTERNSHIPS

Research Internship in High-Energy Physics Phenomenology — 2020, Jul – Sep
CERN, Geneva, Switzerland

Master Class in Mathematical Physics — 2019, Sep – 2020, Jun
NCCR SwissMAP and Mathematics Section, University of Geneva, Switzerland

Business Consulting Internship — 2019, Jul – Aug
Pangea Formazione, Rome, Italy

Research Internship in Experimental Particle Physics — 2017, Sep – Nov
PADME @ INFN – LNF, Frascati, Italy

SCIENTIFIC COMMITTEES AND OTHER ACTIVITIES

Cooperation Associate of the Department of Theoretical Physics — 2022, May – 2024, Sep
CERN, Switzerland

Junior Member of the Scientific Council of the SRS Conference Centre — 2020, Sep – 2024, Sep
SwissMAP Research Station (SRS), Switzerland

Mentee at LeadTheFuture Mentorship Program — 2019, Sep – present
LeadTheFuture, Italy

PUBLICATIONS

Modular resurgence, q-Pochhammer symbols, and quantum operators from mirror curves — 2025, Jun
With V. Fantini
arXiv:2506.08265

Strong-weak symmetry and quantum modularity of resurgent topological strings on local $\mathbb{P}^2$ 2025, Feb
With V. Fantini, Commun. Number Theory Phys. 19 (2025), No. 1, pp. 1-73
https://dx.doi.org/10.4310/CNTP.250215002033

On the arithmetic of resurgent topological strings 2024, Sep
Doctoral Thesis, University of Geneva (2024)
https://dx.doi.org/10.13097/archive-ouverte/unige:181979

Modular resurgent structures 2024, Apr
With V. Fantini
arXiv:2404.11550

On the structure of wave functions in complex Chern–Simons theory 2023, Dec
With M. Mariño
arXiv:2312.00624

Resurgence, Stokes constants, and arithmetic functions in topological string theory 2023, Nov
Commun. Number Theory Phys. 17 (2023), No. 3, pp. 709-820
https://dx.doi.org/10.4310/CNTP.2023.v17.n3.a4

Searching for muonphilic dark sectors with proton beams 2022, Aug
With B. Döbrich and T.-T. Yu, Phys. Rev. D 106 (2022) 3, 035023
https://doi.org/10.1103/PhysRevD.106.035023

An introduction to motivic Feynman integrals 2021, Mar
SIGMA 17 (2021), 032, 56 pages
https://doi.org/10.3842/SIGMA.2021.032

Characterization and performance of PADME's Cherenkov-based small-angle calorimeter 2019, Mar
With A. Frankenthal et al., Nucl. Instrum. Methods Phys. Res. A 919 (2019) 89-97
https://doi.org/10.1016/j.nima.2018.12.035

TALKS AND SEMINARS

Quantum modularity and arithmetic of q-series: lessons from resurgence 2025, Aug
ReNewQuantum Closing Conference, SDU, Denmark

Resurgence and arithmetic of q-series: from quantum operators to quantum modular forms 2025, May
Random Matrix Theory Seminar, University of Oxford, UK

Resurgence, number theory, and quantum mirror curves 2025, May
Mathematical Physics and Algebraic Geometry Seminar, CMSA, Harvard University, USA

The arithmetic of non-perturbative effects 2025, Apr
Conference on Higher Structures, Moduli Spaces and Integrability, Universität Hamburg, Germany

Resurgence, number theory, and quantum mirror curves 2025, Mar
Workshop on The Arithmetic of Calabi-Yau Manifolds, MITP, Germany

The arithmetic of resurgent topological strings 2025, Jan
Youngst@rs Physics and Number Theory, MITP, Germany

The arithmetic of resurgent topological strings 2024, Nov
The Seed Seminar of Mathematics and Physics, IHP, France

The arithmetic of resurgent topological strings 2024, Oct
Workshop on Holonomic Techniques for Feynman Integrals, MPP, Germany

Strong-weak symmetry and quantum modularity of resurgent topological strings 2024, Sep
GAP XIX: Moduli Spaces and Higher Structures, Sapienza University of Rome, Italy

On the structure of wave functions in complex Chern–Simons theory 2024, May
String Theory Seminar, University of Geneva, Switzerland

Strong-weak symmetry and quantum modularity of resurgent topological strings — 2024, May
Workshop on Resurgence and Modularity in QFT and String Theory, GGI, Italy

Strong-weak symmetry and quantum modularity of resurgent topological strings — 2024, May
Mathematics Seminar, Yale University, USA

On the structure of wave functions in complex Chern–Simons theory — 2024, Apr
String Theory Seminar, CERN, Switzerland

Strong-weak duality and quantum modularity of resurgent topological strings — 2024, Mar
Seminar on Quantum Modularity and Resurgence, IHES, France

Resurgence and Calabi–Yau geometries — 2024, Feb
Workshop on Positive Geometry in Particle Physics and Cosmology, MPI MiS, Germany

Strong-weak duality and quantum modularity of resurgent topological strings — 2023, Dec
Geometry and Physics Seminar, University of Sheffield, UK

Strong-weak duality and quantum modularity of resurgent topological strings — 2023, Nov
QM Research Seminar, Centre for Quantum Mathematics, SDU, Denmark

Resurgence, Stokes constants, and arithmetic functions in topological string theory — 2023, Jul
29th Nordic Congress of Mathematicians with EMS, Aalborg, Denmark

Resurgence, Stokes constants, and arithmetic functions in topological string theory — 2023, Apr
Mathematics Seminar, IHES, France

Resurgence, Stokes constants, and arithmetic functions in topological string theory — 2023, Mar
Physical Mathematics Seminar, University of Geneva, Switzerland

Stokes constants in topological string theory — 2022, Nov
Workshop on Mathematics of Beyond All-Orders Phenomena, University of Cambridge, UK

An introduction to motivic amplitudes — 2019, Nov
Seminar on Lie Groups and Moduli Spaces, University of Geneva, Switzerland

Motivic scattering amplitudes — 2019, Aug
Conference on Representation Theory and Integrable Systems, ETH Zürich, Switzerland

Monte Carlo simulation of PADME's small-angle calorimeter — 2017, Dec
PADME Weekly Seminar, INFN – LNF, Italy

ORGANIZED EVENTS

Mini-Workshop on Resurgence, Difference Equations and Quantum Modularity (✧) — 2025, Oct
Mathematisches Forschungsinstitut Oberwolfach (MFO), Germany
Co-organizer with Murad Alim, Veronica Fantini, and Lotte Hollands

TEACHING EXPERIENCE

Teaching Assistant on Feynman Integrals and Number Theory — 2024, Jan
Winter School in Mathematical Physics – SwissMAP Research Station, Les Diablerets, Switzerland

Lecturer on Topological Surfaces — 2019, Oct
Master Class in Mathematical Physics – Mathematics Section, University of Geneva, Switzerland

Lecturer on Riemannian Geometry — 2018, Mar – May
Excellence Program in Physics – Department of Mathematics, Sapienza University of Rome, Italy

ACADEMIC ACHIEVEMENTS AND SCHOLARSHIPS

Excellence Fellowship — 2019 – 2020
NCCR SwissMAP, Switzerland

Degree Prize for Distinction 2019
St John's College, University of Oxford, UK

Torno Subito Scholarship 2018 – 2019
Department of Education, Research, and University, Lazio, Italy

Best Student Award for the Course in Nuclear and Subnuclear Physics 2018
Sapienza University of Rome and INFN, Italy

Summer Student Scholarship 2017
INFN, Italy

Excellence Program 2016 – 2018
Department of Physics, Sapienza University of Rome, Italy

Deserving Student Scholarship 2015 – 2018
Sapienza University of Rome, Italy

SKILLS

Languages	Italian (native), English
Programming Languages	C, C++, Python, R
Data Analysis Languages	MATLAB, ROOT, Gnuplot
Symbolic Calculus Languages	Mathematica, SageMath, PARI/GP
Version-control Systems	Git
Simulation Software	Geant4

(✧) : forthcoming