

# Claudia Rella

[rella@ihes.fr](mailto:rella@ihes.fr) | [claudiarella.com](http://claudiarella.com)

*Institut des Hautes Études Scientifiques (IHES)*  
35 Route de Chartres, 91440 Bures-sur-Yvette, France

## EMPLOYMENT

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

from Oct 2024

## EDUCATION

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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

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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

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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

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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 $\mathbb{P}^2$ With V. Fantini, <i>Commun. Number Theory Phys.</i> 19 (2025), No. 1, pp. 1-73 <a href="https://dx.doi.org/10.4310/CNTP.250215002033">https://dx.doi.org/10.4310/CNTP.250215002033</a>	2025, Feb
On the arithmetic of resurgent topological strings Doctoral Thesis, University of Geneva (2024) <a href="https://dx.doi.org/10.13097/archive-ouverte/unige:181979">https://dx.doi.org/10.13097/archive-ouverte/unige:181979</a>	2024, Sep
Modular resurgent structures With V. Fantini <a href="https://arxiv.org/abs/2404.11550">arXiv:2404.11550</a>	2024, Apr
On the structure of wave functions in complex Chern–Simons theory With M. Mariño <a href="https://arxiv.org/abs/2312.00624">arXiv:2312.00624</a>	2023, Dec
Resurgence, Stokes constants, and arithmetic functions in topological string theory <i>Commun. Number Theory Phys.</i> 17 (2023), No. 3, pp. 709-820 <a href="https://dx.doi.org/10.4310/CNTP.2023.v17.n3.a4">https://dx.doi.org/10.4310/CNTP.2023.v17.n3.a4</a>	2023, Nov
Searching for muonphilic dark sectors with proton beams With B. Döbrich and T.-T. Yu, <i>Phys. Rev. D</i> 106 (2022) 3, 035023 <a href="https://doi.org/10.1103/PhysRevD.106.035023">https://doi.org/10.1103/PhysRevD.106.035023</a>	2022, Aug
An introduction to motivic Feynman integrals <i>SIGMA</i> 17 (2021), 032, 56 pages <a href="https://doi.org/10.3842/SIGMA.2021.032">https://doi.org/10.3842/SIGMA.2021.032</a>	2021, Mar
Characterization and performance of PADME's Cherenkov-based small-angle calorimeter With A. Frankenthal et al., <i>Nucl. Instrum. Methods Phys. Res. A</i> 919 (2019) 89-97 <a href="https://doi.org/10.1016/j.nima.2018.12.035">https://doi.org/10.1016/j.nima.2018.12.035</a>	2019, Mar
<b>TALKS AND SEMINARS</b>	
Resurgent symmetry of quantum mirror curves <sup>(*)</sup> <i>Asymptotics, Geometry, and Physics Seminar, University of Southampton, UK</i>	2025, Nov
Quantum modularity and arithmetic of $q$ -series: lessons from resurgence <i>Mini-Workshop on Resurgence, Difference Equations, and Quantum Modularity, MFO, Germany</i>	2025, Oct
Quantum modularity and arithmetic of $q$ -series: lessons from resurgence <i>ReNewQuantum Closing Conference, SDU, Denmark</i>	2025, Aug
Resurgence and arithmetic of $q$ -series: from quantum operators to quantum modular forms <i>Random Matrix Theory Seminar, University of Oxford, UK</i>	2025, May
Resurgence, number theory, and quantum mirror curves <i>Mathematical Physics and Algebraic Geometry Seminar, CMSA, Harvard University, USA</i>	2025, May
The arithmetic of non-perturbative effects <i>Conference on Higher Structures, Moduli Spaces and Integrability, Universität Hamburg, Germany</i>	2025, Apr
Resurgence, number theory, and quantum mirror curves <i>Workshop on The Arithmetic of Calabi-Yau Manifolds, MITP, Germany</i>	2025, Mar
The arithmetic of resurgent topological strings <i>Youngst@rs Physics and Number Theory, MITP, Germany</i>	2025, Jan
The arithmetic of resurgent topological strings <i>The Seed Seminar of Mathematics and Physics, IHP, France</i>	2024, Nov
The arithmetic of resurgent topological strings <i>Workshop on Holonomic Techniques for Feynman Integrals, MPP, Germany</i>	2024, Oct

Strong-weak symmetry and quantum modularity of resurgent topological strings <i>GAP XIX: Moduli Spaces and Higher Structures, Sapienza University of Rome, Italy</i>	2024, Sep
On the structure of wave functions in complex Chern–Simons theory <i>String Theory Seminar, University of Geneva, Switzerland</i>	2024, May
Strong-weak symmetry and quantum modularity of resurgent topological strings <i>Workshop on Resurgence and Modularity in QFT and String Theory, GGI, Italy</i>	2024, May
Strong-weak symmetry and quantum modularity of resurgent topological strings <i>Mathematics Seminar, Yale University, USA</i>	2024, May
On the structure of wave functions in complex Chern–Simons theory <i>String Theory Seminar, CERN, Switzerland</i>	2024, Apr
Strong-weak duality and quantum modularity of resurgent topological strings <i>Seminar on Quantum Modularity and Resurgence, IHES, France</i>	2024, Mar
Resurgence and Calabi–Yau geometries <i>Workshop on Positive Geometry in Particle Physics and Cosmology, MPI MiS, Germany</i>	2024, Feb
Strong-weak duality and quantum modularity of resurgent topological strings <i>Geometry and Physics Seminar, University of Sheffield, UK</i>	2023, Dec
Strong-weak duality and quantum modularity of resurgent topological strings <i>QM Research Seminar, Centre for Quantum Mathematics, SDU, Denmark</i>	2023, Nov
Resurgence, Stokes constants, and arithmetic functions in topological string theory <i>29<sup>th</sup> Nordic Congress of Mathematicians with EMS, Aalborg, Denmark</i>	2023, Jul
Resurgence, Stokes constants, and arithmetic functions in topological string theory <i>Mathematics Seminar, IHES, France</i>	2023, Apr
Resurgence, Stokes constants, and arithmetic functions in topological string theory <i>Physical Mathematics Seminar, University of Geneva, Switzerland</i>	2023, Mar
Stokes constants in topological string theory <i>Workshop on Mathematics of Beyond All-Orders Phenomena, University of Cambridge, UK</i>	2022, Nov
An introduction to motivic amplitudes <i>Seminar on Lie Groups and Moduli Spaces, University of Geneva, Switzerland</i>	2019, Nov
Motivic scattering amplitudes <i>Conference on Representation Theory and Integrable Systems, ETH Zürich, Switzerland</i>	2019, Aug
Monte Carlo simulation of PADME’s small-angle calorimeter <i>PADME Weekly Seminar, INFN – LNF, Italy</i>	2017, Dec

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## ORGANIZED EVENTS

Mini-Workshop on Resurgence, Difference Equations and Quantum Modularity <i>MFO, Germany</i> Co-organized with Murad Alim, Veronica Fantini, and Lotte Hollands	2025, Oct
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## TEACHING EXPERIENCE

Teaching Assistant on Feynman Integrals and Number Theory <i>Winter School in Mathematical Physics – SwissMAP Research Station, Les Diablerets, Switzerland</i>	2024, Jan
Lecturer on Topological Surfaces <i>Master Class in Mathematical Physics – Mathematics Section, University of Geneva, Switzerland</i>	2019, Oct

## ACADEMIC ACHIEVEMENTS AND SCHOLARSHIPS

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Excellence Fellowship <i>NCCR SwissMAP, Switzerland</i>	2019 – 2020
Degree Prize for Distinction <i>St John's College, University of Oxford, UK</i>	2019
Torno Subito Scholarship <i>Department of Education, Research, and University, Lazio, Italy</i>	2018 – 2019
Best Student Award for the Course in Nuclear and Subnuclear Physics <i>Sapienza University of Rome and INFN, Italy</i>	2018
Summer Student Scholarship <i>INFN, Italy</i>	2017
Excellence Program <i>Department of Physics, Sapienza University of Rome, Italy</i>	2016 – 2018
Deserving Student Scholarship <i>Sapienza University of Rome, Italy</i>	2015 – 2018

## SKILLS

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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