SCIENTIFIC ACTIVITY

SLAVA RYCHKOV worked on the lightcone bootstrap - a set of techniques enabling predictions about high-spin spectrum of any conformal field theory, and proved some major conjectures in this domain made a decade ago. He is also continuing to develop the rigorous theory of tensor network renormalization group (jointly with Tom Kennedy). The final goal of this project is to establish rigorous existence of lattice renormalization group fixed points corresponding to the critical points of the Ising model in two dimensions and, over a longer term, in three dimensions.

Slava RYCHKOV

Theoretical Physics,
Permanent Professor since 2017.

DISTINCTIONS

New Horizons Prize in Physics (2014)
Institut Universitaire de France, junior member (2012-2017)
Grand prix Mergier-Bourdeix, Académie des sciences de Paris (2019)

Editor of:
SciPost Physics

PUBLICATIONS

With T. Kennedy
Tensor RG Approach to High-temperature Fixed Point
J. Stat. Phys. **187** (2022) 33, preprint arXiv:2107.11464.

Tensor Renormalization Group at Low Temperatures: Discontinuity Fixed Point
Preprint arXiv:2210.06669.

With A. Kaviraj and E. Trevisani
The Fate of Parisi-Sourlas Supersymmetry in Random Field Models
Phys. Rev. Lett. **129** (2022) 045701, preprint arXiv:2112.06942.

With S. Pal and J. Qiao
Twist Accumulation in Conformal Field Theory. A Rigorous Approach to the Lightcone Bootstrap
Preprint arXiv:2212.04893.

Slava Rychkov lors des Cours de l'IHES

CONFERENCES

Armenia
Theoretical Physics Seminar, Alikhanyan National Science Laboratory, Yerevan (April 14) *The 3d Ising Model and the Conformal Bootstrap* (seminar)

Canada
Conformal Field Theory and Quantum Many-body Physics, Centre de Recherches Mathematiques, Université de Montréal, Québec (August 22 - September 9) *The Fate of Parisi-Sourlas Supersymmetry in Random-field Models* (conference)

China (P.R.)
Theoretical Physics Group, Shing-Tung Yau Center, Southeast University, Nankin (December 6) *Random Field Ising and Parisi-Sourlas Supersymmetry* (video seminar)

France
Azat Miftakhov Days against the War, IHES, Bures-sur-Yvette (July 5 - 6) *"Bootstrap" Method in Physics and Mathematics* (seminar)

Mini-school on Universality in Mathematical Physics: Random Geometries, Field Theories and Hydrodynamics, École normale supérieure, Lyon (July 26 - 30) *Tensor Renormalization Group Approach to Lattice Models* (3 lectures)

Cours de l'IHES, IHES, Bures-sur-Yvette (November 7, 14, 16 and 17) *Random Field Ising Model and Parisi-Sourlas Supersymmetry* (4 lectures)

Germany
The Renormalization Group, Mathematisches Forschungsinstitut Oberwolfach (July 17 - 23) *Fermionic Models with Long-range Interactions: Wilsonian RG Flows and Fixed Points* (conference)

Italy
PhD School - Mathematics Meets Physics on Disordered Systems, Sapienza, Università di Roma, Cortona (April 25 - March 6) *Random Field Ising Model and Parisi-Sourlas Supersymmetry - Some Recent Developments* (4 lectures)

Levi-Civita Colloquia, Center for Mathematics and Theoretical Physics, Università di Roma III (May 10) *"Bootstrap" Method in Physics and Mathematics* (symposium)

Advances in Classical, Quantum and Statistical Mechanics, A Celebration of the Work and Contributions of Giovanni Gallavotti in the Occasion of his 80th Birthday, Università di Roma III (May 11 - 13) *The Dream of Non-perturbative Precision RG* (conference)

Theory Colloquia, Physics Department, Università di Torino (May 13) *The Conformal Bootstrap Approach to Criticality in 3 and 2+1 Dimensions* (symposium)
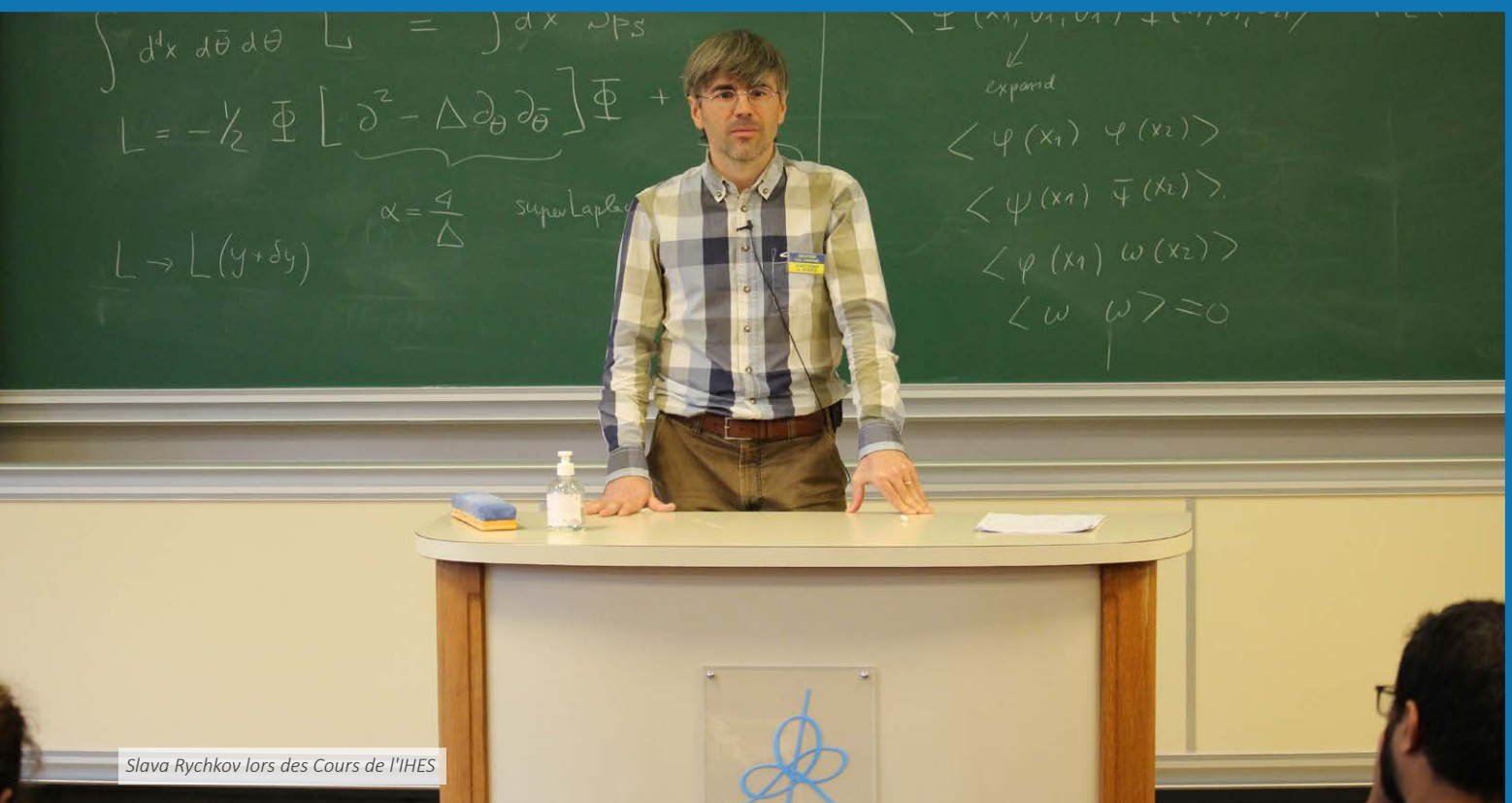
Bootstrapping Nature: Non-perturbative Approaches to Critical Phenomena, Galileo Galilei Institute for Theoretical Physics, Florence (October 3 - November 4) *Developments and Applications of Numerical Bootstrap* (conference) *The Fate of Parisi-Sourlas Supersymmetry in Random Field Ising Model* (conference)

United Kingdom
Condensed Matter Group Seminar, Oxford University (April 8) *Deligne Categories in Lattice Models and Quantum Field Theory, or Making Sense of $O(N)$ Symmetry with Non-integer N* (video seminar)

United States
2022 Simons Collaboration on the Nonperturbative Bootstrap Annual Meeting, Simons Foundation, New York (November 10 - 11) *Twist Accumulation in Conformal Field Theory: a Rigorous Approach to the Lightcone Bootstrap* (conference)

Switzerland
Entanglement Scaling and Criticality with Tensor Networks, Bernoulli Center, EPFL, Lausanne (November 28 - December 2) *Towards Exact RG Fixed Points (Does Tensor RG Converge Because of Truncation Effects?)* (conference)

Video conference
One World Mathematical Physics Seminars of the IAMP, International Association of Mathematical Physics (September 20) *Tensor Renormalization Group at Low Temperatures* (video seminar)