



ICTP | International Centre for Theoretical Physics
SAIFR | South American Institute for Fundamental Research

Campus of IFT-UNESP – São Paulo, Brazil

September 14 – 25, 2026

SCHOOL ON ANALYTICAL AND NUMERICAL METHODS FOR DISORDERED QUANTUM SYSTEMS



BRUNO BERTINI
University of Birmingham, UK
*Non-Equilibrium Quantum
 Many-Body Physics
 with Quantum Circuits*



TOBIAS MICKLITZ
CBPF, Brazil
*Field Theory Approach to
 Random Quantum Circuits*



DARIO ROSA
ICTP-SAIFR & IFT-Unesp, Brazil
*Introduction to Numerical Methods
 for Quantum Many-body Physics*



LEA F. SANTOS
University of Connecticut, USA
*Random Matrices and Many-Body Quantum
 Systems: Dynamics and Thermalization*

The dynamics of information in closed many-body systems is a cornerstone of modern physics, bridging disciplines from thermalization and black hole thermodynamics to quantum information processing. Despite extensive study into how disorder suppresses scrambling, the existence and stability of the Many-Body Localized (MBL) phase remain among the most challenging questions in theoretical research.

This school is designed to transition participants from advanced undergraduate quantum mechanics to active research in quantum disordered systems. Students will engage with the challenges of the exponentially large Hilbert space and master the sophisticated analytical and numerical tools required to navigate it.

Four specialized courses provide a comprehensive overview of state-of-the-art methodologies. Prioritizing the principle of “learning by computing,” the program bridges abstract theory and practical implementation through: in-depth lectures on state-of-the-art research approaches; dedicated exercise sessions focused on concrete physical problems; and development of the computational and analytical toolkit required in modern research.

Application deadline:

June 14, 2026

Online application and more information:

ictp-saifr.org/sanmdqs2026



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