

# Exact Solvability and Quantum Information

Session CXXVI

August 4<sup>th</sup> – 29<sup>th</sup>, 2025

## Organizers:

**Stéphane OUVRY** (Laboratoire de Physique Théorique et Modèles Statistiques, CNRS, Université Paris-Saclay), **Tomaž PROSEN** (Faculty of Mathematics and Physics, University of Ljubljana), **Didina SERBAN** (Institut de Physique Théorique, CEA Saclay), **Masahito YAMAZAKI** (Kavli Institute for the Physics and Mathematics of the Universe, University of Tokyo)

## Overview:

One of the most successful modern approaches to interacting quantum systems is through the concept of quantum information. The school will cover mainly topics in quantum information applied to condensed matter many-body physics (tensor networks, random circuits, topological excitations, quantum simulators, transport, effect of chaos and decoherence), as well as their relations to high energy physics/holography. The theoretical perspective is centered on integrability and exact solvability in a broader sense.

**Website:** <https://www.lptms.universite-paris-saclay.fr/leshouches2025>

## Topics:

Introduction to integrability  
Quantum information  
Holographic perspective  
Integrability with defects and boundaries  
Topological quantum information  
Analog quantum simulation  
Tensor networks  
Integrable dynamics  
Generalized hydrodynamics  
Quantum simulation, digital  
Random circuits and measurement induced phase transitions  
Physics of LDPC codes  
Many-body quantum chaos

## First confirmed lecturers:

Fabian Essler (Oxford)  
Olivier Giraud (LPTMS Paris-Saclay)  
Juan Maldacena (Institute for Advanced Study, Princeton)  
Charlotte Kristjansen (Niels Bohr Institute)  
Kareljan Schoutens (University of Amsterdam)  
Immanuel Bloch (Ludwig Maximilian University, Munich)  
Frank Verstraete (Cambridge & Ghent University)  
Balázs Pozsgay (Eötvös Loránd University Budapest)  
Jacopo De Nardis (CY Cergy Paris Université)  
Zlatko Mineev (IBM)  
Romain Vasseur (UMass Amherst)  
Vedika Khemani (Stanford)  
Bruno Bertini (Birmingham)

**Topical seminars** will be given during the school by distinguished invited scientists

**Poster presentations** by participants

**Registration:** The online Application Form can be found at <https://www.houches-school-physics.com>. Applications must reach the School before March 15th, 2025 in order to be considered by the Selection Committee. The full cost per participant includes housing and meals, and is specified on the School's Website. Further information can be found on the website too. For scientific matters, please contact the organizers at [didina.serban@ipht.fr](mailto:didina.serban@ipht.fr).

For administrative and logistical matters, please contact the Les Houches Physics School at:

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**Location:** Les Houches is a village located in Chamonix valley, in the French Alps. Established in 1951, the Physics School is situated at 1150 m above sea level in natural surroundings, with breathtaking views on the Mont-Blanc mountain range, conducive to reflection and discussion.