Quantum Information Meets Quantum Matter

From Quantum Entanglement to Topological Phase in Many-Body Systems

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Target audience:

- Master students from the Master Program in Mathematical Physics
- Open to students form other programs in Maths and Physics

Prerequisites:

- Mathematical Analysis, Linear Algebra and Probability Theory
- No prior knowledge on Quantum Physics is assumed

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Aim of the seminar:

- Explore the connections between the fields of **Quantum Information Theory** and **Quantum Many-Body Systems**
- Quantum information processing offers secure and high rate information transmission, as well as fast computational solution of certain important problems
- It provides it provides new angles, tools and methods which help in understanding other fields of science, such as **Quantum Matter**

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Topics related to:

- Correlation and entanglement, evolution of quantum systems, error correction
- Local Hamiltonians, ground states and many-body entanglement
- Gapped quantum systems and entanglement area law
- Topological order and long-range entanglement
- Gapped topological phases and tensor networks

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Structure of the seminar:

- Follow the structure of the book: "**Quantum Information Meets Quantum Matter**", by Zeng, Chen, Zhou and Wen
- It will be a block seminar during 2 weeks: **January 15-26**
- The sessions will take place every **Tuesday, Wednesday** and **Thursday** from **4pm** to **6pm** and from **6pm** to **8pm**.

First meeting:

Monday, **July 17**, at **2pm**. Room **S08**