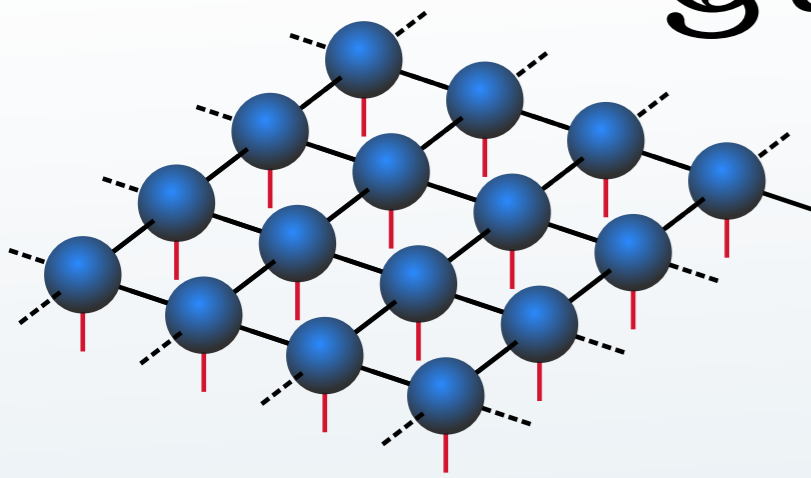


# Quantum Tensor Networks



A new course in summer semester  
for master and PhD students



## Basic Information

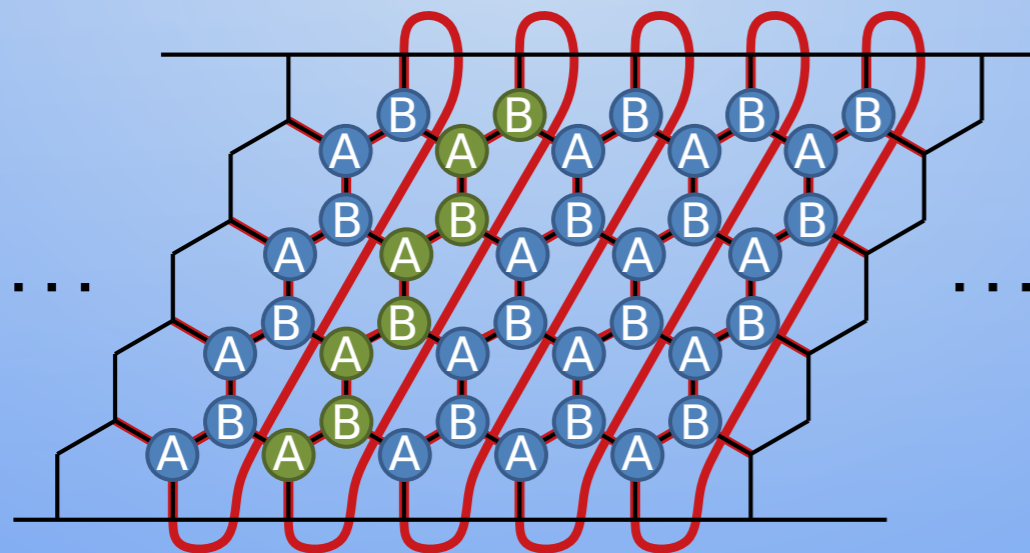
**Language:** English

**Lecturer:** Jacek Dziarmaga

**Examination:** exam

**ECTS points:** 3

**USOS code:** (WFAIS.IF-Y503.0)



## Scope of the lectures

- Quantum entanglement, Schmidt decomposition, singular value decomposition, elements of tensor networks.
- The canonical form of a tensor network.
- Suzuki-Trotter distribution of unitary evolution operator: TEBD algorithm.
- Left and right canonical tensor networks in 1D: DMRG algorithm.
- Evolution in a space tangent to a manifold of a tensor network.
- Renormalization group in real space: MERA algorithm.
- 2D tensor network: PEPS.
- Tensor networks in the continuum: quantum field theory.
- Quantum topological order and tensor networks.
- Tensor networks and neural networks.
- Fermi statistics, symmetries in tensor networks.