



THE BOLOGNA LECTURES

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Entanglement and non-Equilibrium Physics in Extended Quantum Systems

This course will introduce modern quantum field theory approaches to the computation of measures of entanglement and the description of many-body quantum systems out-of-equilibrium. The focus will be on 1+1 dimensional quantum field theory.

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15-24 November 2016

Course Outline

- Introduction: Integrable Quantum Field Theory and Conformal Field Theory in 1+1 Dimensions (1h)
- Classical Approaches to 1+1D integrable QFT: The Form Factor Programme and Thermodynamic Bethe Ansatz (2h)
- Basics of CFT: Conformal Invariance and The Chiral Stress-Energy Tensor (1h)
- Measures of Quantum Entanglement: Entanglement Entropy and Logarithmic Negativity (1h)
- Replica Approach to Entanglement: Partition Functions on Branched Surfaces and Branch Point Twist Fields (4h)
- Non Equilibrium Quantum Steady States: Currents and their Fluctuations (1h)
- Real-Time and Hydrodynamic Approaches to non-Equilibrium Steady States: Chiral Scattering and Generalized Hydrodynamics (4h)