Advanced Student Seminar on Selected Topics in Quantum Field Theory

Winter Term 2021/2022

N. Callebaut and M. Zirnbauer

- Dualities
  - Kramers-Wannier duality of the two-dimensional Ising model
  - Abelian lattice dualities from differential chain calculus
  - Boson-vortex duality: superconductor-insulator transition
- Particle physics phenomenology
  - Non-abelian lattice gauge theory: area law and confinement
  - Strong CP problem: Peccei-Quinn model and the axion
  - Renormalization: unification of gauge couplings at GUT scale
- Fundamental and modern aspects of CFT
  - Axioms of topological/conformal field theory (TFT/CFT)
  - Conformal symmetry: algebra and charges
  - Wess-Zumino-Witten model from non-Abelian bosonization
  - Bosonic strings from path integral: quantum Liouville theory
  - Conformal bootstrap: conformal blocks & crossing symmetry
  - Central charge of CFT: physical interpretations
  - Entanglement in 2d CFT and its holographic interpretation
  - Semiclassical conformal block in two-dimensional CFT

When: Thursdays, 16:30 - 18:00
Where: Seminarraum der Theorie und ZOOM
Starts on: Thu, Oct 14, 2021