

Train by tunneling: Quantum annealing for AI optimization

Mittwoch, 12. November 2025 15:00 (30 Minuten)

Quantum annealing offers a hardware route to solving rugged discrete optimisation problems that appear throughout AI. This talk shows how to cast learning and inference tasks into QUBO or Ising form, then use forward and reverse annealing to navigate nonconvex loss landscapes. I will present compact case studies in classifier training, feature selection, model selection, and physics parameter fitting, benchmarking against classical heuristics and highlighting when tunnelling provides a real advantage. Practical guidance covers minor embedding, precision limits, and zooming strategies, as well as hybrid loops where annealers act as inner optimisers within standard ML workflows. Concretely, I will demonstrate neural network training with Ising-encoded losses, annealer-based solvers for differential equations, and fast, robust parameter-fitting workflows. Across these examples, I will summarise when quantum and thermal annealing excel, the practical limits of present hardware, and how to integrate quantum annealing into hybrid ML workflows for near-term impact.

Vortragende(r): SPANNOWSKY, Michael (IPPP Durham)

Sitzung Einordnung: Plenary