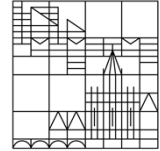
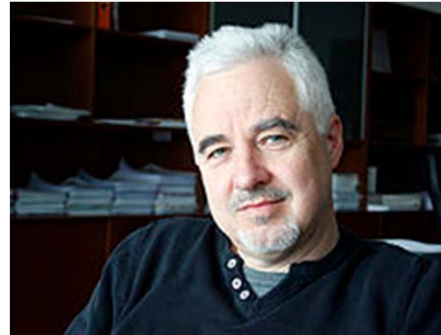


Physikalisches Kolloquium

Universität
Konstanz



Di 08.11.16
15:15 Uhr
14:45 Uhr, Kaffee/Tee
R 513



Prof. Dr. Hans J. Briegel
Universität Innsbruck,
Österreich

Quantum physics meets artificial intelligence

Quantum mechanics has changed the way we think about the ultimate scope and limits of information processing and the foundations of theoretical computer science. Research in quantum information and quantum computation has led to algorithms and protocols which surpass classical approaches in terms of efficiency, and in the levels of security which are attainable, as in the case of quantum cryptography. Recently we have seen the application of concepts from quantum information to machine learning, and companies including Google have publicly announced their own research efforts in this direction. In this talk, I will discuss the potential role of quantum mechanics for artificial intelligence and vice versa. This includes both the use of (classical) machine learning and robotics in future quantum physics laboratories, as well as the use of quantum physics for learning and for intelligent agent design. I will then focus on the model of projective simulation (PS) for learning agents. PS agents employ random walk processes in their memory for deliberation and decision making. The PS model can solve basic tasks in reinforcement learning but it also allows for the implementation of advanced concepts such as generalization and meta-learning, and it has been applied in robotics. Projective simulation can be quantized, allowing for a quantum speed-up of the agent's deliberation process.

