



UNIVERSITÄT
LEIPZIG

Fakultät für Physik und
Geowissenschaften

Prof. Dr. J. Deiglmayr
Prof. Dr. J. Vollmer

Physics Colloquium

Tuesday, 06 July 2021 at 17:00

Prof. Dr. Christiane Koch

Freie Universität Berlin

Training Schrödinger's cat: Quantum control in molecular physics and quantum information science

Control refers to the ability to steer a dynamical system using external fields; quantum control does so by exploiting quantum coherence, *i.e.*, the wave nature of matter. One way to think of it is in terms of constructive and destructive interference between different quantum pathways, all connecting the same initial and final states. I will illustrate the concept of pathway interference using the photoionization of chiral molecules, *i.e.*, molecules with a left-handed or right-handed nuclear scaffold, as example. The ionizing field may be tailored to minimize or maximize the signature of molecular handedness in the photoelectron spectrum, using interference between pathways probing different intermediate states.



The essential elements of quantum physics, quantum coherence and entanglement, are not only the agents of quantum control, they are also at the core of emerging quantum technologies such as quantum-enhanced sensing or quantum information processing. I will discuss how quantum control allows to identify fundamental performance bounds and derive protocols to reach these performance bounds in realistic models for basic building blocks of quantum-enhanced sensing and quantum information processing.

Online Colloquium broadcasted by BigBlueButton at

<https://lecture.uni-leipzig.de/b/vol-qad-yhg-c2k>

