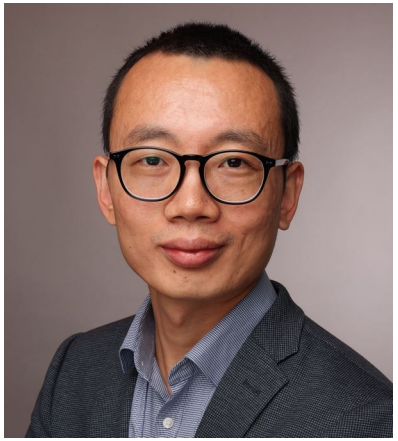
Fachgruppe Physik und Astronomie Universität Bonn

Physikalisches Kolloquium

Fachgruppe Physik/Astronomie der Universität Bonn

UNIVERSITÄT BONN

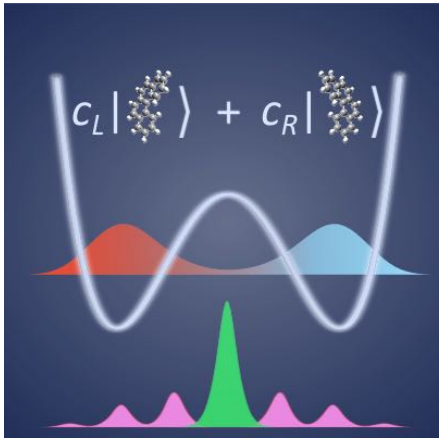
Freitag, 16. Juni 2023, 13 Uhr c.t. im Hörsaal I des Physikalischen Instituts



Daqing Wang

Universität Kassel

„Exploring quantum fundamentals and technologies with single controlled molecules“



Molecules are ubiquitous in nature and play a crucial role in physics, chemistry, and biology. Using light to detect, measure, and control molecules at the quantum level is an emerging field of research. Such experimental masteries of light-molecule interactions provide not only a platform for investigating fundamental questions in quantum mechanics, but also new possibilities to develop building blocks for quantum technology.

In this presentation, I will give an overview of our research activities focused on studying light-molecule interactions at the level of single molecules and single photons. In the first part of my talk, I will present an experiment aimed at performing precise measurements on chiral molecules through the action of optical forces. Detecting such forces will open up possibilities for molecular metrology and studying fundamental questions such as decoherence and parity-violation effects in molecules. In the second part, I will review our activities in developing quantum light-matter interfaces based on single dye molecules in the solid state. Here, we aim to combine recent advances in single-molecule microscopy, precision spectroscopy, single-spin control and cavity quantum electrodynamics to exploit the potential of single molecules as quantum network nodes.