

Dr. Stefan Nimmrichter

Macroscopic matter-wave interferometry

Supervisor: Markus Arndt

ABSTRACT

In my thesis I have developed theoretical methods to facilitate, assess, and interpret macroscopic matter-wave interference experiments with molecules and nanoparticles, as conceived and implemented in the Quantum Nanophysics Group at the University of Vienna. I will give a short overview of these methods with a focus on the feasible mass limits of the most recent implementation of the Talbot-Lau near-field interference scheme in Vienna. I will then turn to the question of how to quantify the macroscopicity of mechanical quantum phenomena in general, developing a systematic and observation-based answer. This admits an objective comparison between arbitrary quantum experiments on mechanical systems.