Single-molecule dynamics at variable temperatures

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Single-molecule optics has evolved from a specialized variety of optical spectroscopy at low temperatures into a versatile tool to address questions in physics, chemistry, biology, and materials science. In this thesis, the potential of single-molecule (and ensemble) optical microscopy at variable temperatures is demonstrated: Electron transfer has been identified as a crucial step in the photodynamics of organic fluorophores, and long-term memory effects have been discovered in the relaxation dynamics of supercooled glycerol. Additionally, a novel technique, temperature-cycle microscopy of single-molecule dynamics, has been developed. This method aims to increase the observation time in single-molecule experiments at room temperature. The necessary rapid temperature cycles by laser-induced local heating inside a cryostat have been characterized and calibrated.

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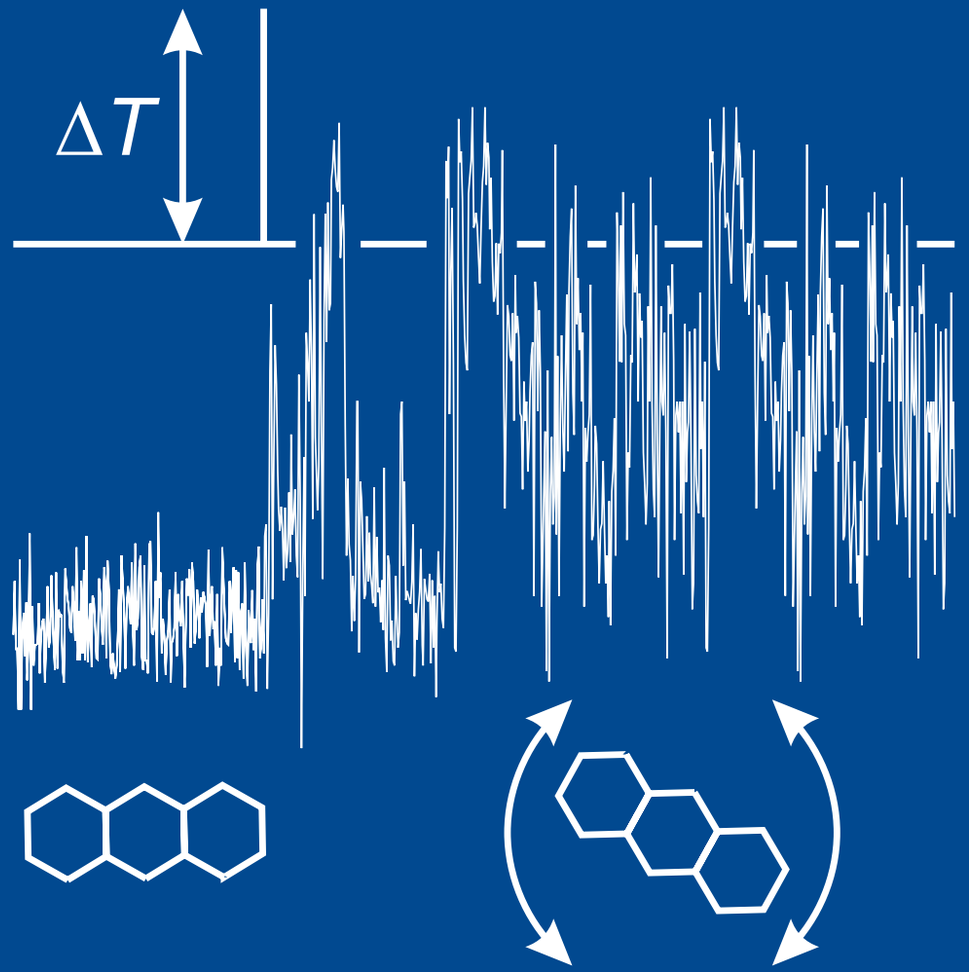

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