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Reaction mechanisms and quantum control in molecular rotors and switches

Abstract:

The design and control of molecular devices, such as molecular machines and switches, is a fascinating quest in science and nanotechnology. Molecular machines have received a lot of attention since several examples of synthetic molecular rotors have been reported during the last years, e.g. overcrowded alkenes, which are capable of unidirectional rotation via a series of cis/trans photochemical and helix-inversion thermal steps. In this talk, I will first focuse on the mechanisms of two such molecular rotors, which provide a valuable insight into the conformational dynamics of the rotary cycle of overcrowded alkenes. Moreover, it will be shown that using ultrafast laser pulses, unidirectional rotation can be achieved. Secondly, I will also show different mechanisms which allow the control of a haptotropic molecular switch using strong laser fields.