QUANTUM STATE CONTROL OF CHIRAL MOLECULES

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Recently, enantiomer-specific state transfer (ESST) was demonstrated using frequency-, phase-, and polarization-controlled microwaves [1]. This method allows to populate or depopulate a rotational state of a chosen enantiomer, providing a way of quantum-controlled chiral separation. In the past, the transfer efficiency of ESST was limited by the initial thermal population of the energy levels participating in ESST [1,2] and by spatial degeneracy [3].

To address these prior limitations, we developed a new experimental scheme by combining optical methods [4] with microwave spectroscopy. This increased the efficiency of ESST by over a factor of ten compared to previously reported values [5]. Our scheme enables a quantitative comparison between experiment and theory involving the absolute ground state level. I will discuss recent experimental results and our ongoing work aiming at perfect ESST in my presentation.

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