Quantum Dynamics in Tailored Intense Fields

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## Spatial separation of chiral molecules with electric fields

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Chirality is now one of the top-class subjects in physical, chemical and biological academic research as well as industrial pharmacology. Accurate experimental characterisation of the enantiomeric excess and absolute handiness in mixtures of chiral molecules, efficient chiral purification and discrimination remain very challenging and highly demanding tasks for a broad scope of applications. A number of novel experiments have recently been developed for measuring the enantiomeric excess [1,2] and absolute handiness [3] as well as preparation of the enantiomerically enriched samples [4].

Here we propose a new robust scheme for enantiomeric enrichment in a cold beam of chiral molecules. First, we employ an off-resonant optical centrifuge pulse combined with a strong static dc-field to create a difference in the rotational state population distributions of two enantiomers. Molecules then continue into an electro-static deflector, where different rotational states are spatially separated. Our realistic theoretical calculations for the propylene-oxide molecule predict up to 30% enantiomeric enrichment. Challenges and perspectives for future experimental realisation are discussed.

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**Primary authors:** OWENS, Alec (CFEL, CUI, Universität Hamburg); YACHMENEV, Andrey (CFEL, DESY, CUI Hamburg); KÜPPER, Jochen (CFEL, DESY and Universität Hamburg); ONVLEE, Jolijn (CFEL Hamburg)

Presenter: YACHMENEV, Andrey (CFEL, DESY, CUI Hamburg)

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