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41 - Controlled enantioselective orientation of chiral molecules with an optical centrifuge

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We initiate unidirectional rotation of chiral molecules with an optical centrifuge and detect their spatial orientation by means of Coulomb explosion imaging. We show that the centrifuge-induced orientation of one of the molecular axes in the laboratory frame depends on the relationship between the chiral handedness of the enantiomer and the direction of the laser-induced molecular rotation. The effect is reproduced in the numerical simulations of the centrifuge excitation followed by Coulomb explosion of the centrifuged molecule. The demonstrated technique offers not only an alternative way of differentiating between molecular enantiomers, but also a new approach to enantioselective manipulation of chiral molecules with light.

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