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Spatially separating individual conformers of neutral molecules

Large (bio)molecules exhibit multiple conformers (structural isomers), even under the cold conditions present in a supersonic jet. For various applications, i. e., scattering experiments, it would be highly desirable to prepare molecular packets of individual conformers.
It is well-known that polar molecules can be manipulated using strong electric fields. Many techniques have been developed for the manipulation of small molecules in low-field-seeking quantum states. However, application of these techniques to large molecules is not straightforward, because, for larger molecules, all states are high-field seeking at the relevant electric field strengths. To manipulate the motion of large molecules one has to use Alternate Gradient (dynamic) focusing. This method has been successfully demonstrated in the Alternate Gradient deceleration of CO and YbF. Using the same Alternate Gradient focusing principle, applying switched electric fields in a quadrupole guide, we have set up a new experiment to spatially separate individual conformers of large molecules. This experiment exploits the different mass-to-dipole (m/μ) ratios, similar to a quadrupole mass-to-charge (m/q) filter for ions.
In a proof-of-principle experiment, we have demonstrated the conformer selection of cis- and trans-3-aminophenol.