Abstract Submitted
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Slowing and Focusing of Molecules and Atoms in Pulsed Optical Fields RAY FULTON, ALEXIS BISHOP, PETER BARKER, Heriot-Watt University — We demonstrate a general scheme for the deceleration of molecules in a high intensity (1.6 x 10^{16} W/m^2) pulsed optical field. Using this method we have reduced the translational energy of cold benzene molecules in a molecular beam by 15 % in a single pulse of 10 ns duration[1].The large gradient force from a focused beam of an injection seeded Q-switched Nd:YAG laser was used to decelerate the benzene molecules seeded in a supersonic jet from 320 m/s to 295 m/s without ionization or dissociation. This 25 m/s reduction in velocity corresponds to an average deceleration of 10^8g. The same high intensity Gaussian laser beam was used to focus ground state xenon atoms in a supersonic jet to a spot size of 7.6 μm indicating that this very general scheme can be used to manipulate a wide range of atomic and molecules species. References: [1] R. Fulton, A.I. Bishop, P.F. Barker. Phys. Rev. Lett. **93**, 243004 (2004)

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