Abstract Submitted
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Optical Stark deceleration of cold molecules P.F. BARKER, University College London — Our work in this rapidly developing field of cold molecules has centered on the development of optical Stark deceleration, which momentarily traps and brings molecules to rest, initially with a molecular beam. This is done utilizing the large optical potentials that result from the interaction between an induced dipole moment and the intense optical field (10^{12} W/cm^2) that induced it. As all molecules are polarizable, in principle any molecule or atom can be manipulated and slowed in the same manner, opening up the capability of creating essentially any cold molecular species. We describe our experiments, where we have successfully slowed every species that we have so far placed within the molecular beam[1-3]. This includes the organic molecule benzene (non-polar) and nitric oxide (weakly polar), as well as ground state xenon, the inert buffer gas used to form the molecular beam. Benzene, at a density of 10^{11} cm^{-3}, has been brought to rest using a pulsed optical lattice created by two near counter-propagating optical fields. [1] R. Fulton, A.I. Bishop, P.F. Barker, Phys. Rev. Lett. **93**, 243004 (2004) [2] R. Fulton, A. Bishop, M.N. Shneider, P.F. Barker, Nature Physics **2**, 465 (2006) [3] R. Fulton, A.I. Bishop, M.N. Shneider, P.F. Barker, J. Phys. B: At. Mol. Opt. Phys. **39,** S1097 (2006)

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