

Abstract Submitted  
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**Coherent control of vibrational state distribution in non-polar molecules**<sup>1</sup> ANTONIO PICON, JILA and Department of Physics, University of Colorado, 440 UCB, Boulder, CO 80309-0440, JENS BIEGERT, ICFO, Institut de Ciències Fòniques, Mediterranean Technology Park, E-08860 Castelldefels (Barcelona), Spain, AGNIESZKA JARON-BECKER, ANDREAS BECKER, JILA and Department of Physics, University of Colorado, 440 UCB, Boulder, CO 80309-0440 — A novel coherent control scheme for the vibrational state distribution in nonpolar molecules is proposed. We apply the scheme to  $\text{H}_2^+$  and study it theoretically and numerically. Our results reveal a two-photon selective excitation, which is robust against dissociation, and a dynamical Stark shift, which depends linearly on the laser intensity. By using a controllable spectral-phase laser pulse (or a train of pulses) a complete coherent transfer can be achieved from one vibrational state to another.

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