

Abstract Submitted
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Control of electron localization in a molecule using XUV and IR pulses KAMAL P. SINGH, J R McDonald Lab, Physics Department, Kansas State University, KS, 66502 , P. RANITOVIC, W. CAO, S. DE, D. RAY, S. CHEN, I. BOCHAROVA, M. MAGRAKVELIDZE, H. MASHIKO, F. HE, U. THUMM, A. BECKER, I. LITVINYUK, C.L. COCKE, J R MCDONALD LAB, PHYSICS DEPARTMENT, KANSAS STATE UNIVERSITY, KS, 66502 TEAM, JILA, AMO THEORY DIVISION, COLORADO COLLABORATION — We demonstrate experimental control of electron localization in the deuterium molecular ion created and dissociated by the combined action of an attosecond pulse train (APT) and a femtosecond IR pulse. The APT is synthesized by a two-color method and consists of one attosecond pulse per optical cycle of the fundamental driving field. A left-right asymmetric ejection of deuterium ions is observed using COLTRIMS. This asymmetry undergoes oscillations with a full optical cycle period when the time delay between the APT and IR pulses is scanned in 0.3 fs steps. An analysis of the kinetic energies of the released ionic fragments suggests that the underlying mechanism of the localization control takes place primarily as the dissociating molecule passes through the bond-softening region of internuclear distance. Our results agree well with a theory based on the numerical solution of the corresponding Schrodinger's equation.

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