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**Molecular interferometer to decode attosecond electron-nuclear dynamics** ALICIA PALACIOS, ALBERTO GONZÁLEZ-CASTRILLO, FERNANDO MARTIN, Univ Autonoma de Madrid — A full characterization of the coupled electronic and nuclear dynamics in molecules is achieved by using an attosecond XUV-pump/XUV-probe scheme [Palacios et al., PNAS 111, 3973 (2014); Carpeggiani et al., Phys. Rev. A 89, 023420 (2014)]. The complete information on the wave packet generated by the pump pulse is obtained without introducing significant distortions through the pulses themselves. Theoretical ab initio calculations are presented for the hydrogen molecule, together with simple models for interpretation that can be easily extrapolated to larger systems. Different from the commonly used XUV-IR schemes, where the observed dynamics is typically dominated by the relatively strong IR field [Zhou et al., Nat Phys 8, 232 (2012); Dahlström et al., J. Phys. B 45, 183001 (2012)], XUV pulses of few-femtosecond and attosecond durations have been recognized as the ideal tool because their short wavelengths ensure a negligible distortion of the molecular potential. In the work presented here, the molecule is illuminated with twin XUV pulses with a given delay, creating a molecular interferometer due to electron ejection through both direct and sequential two-photon absorption leaving the molecule in the same final vibronic state.

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