

Abstract Submitted  
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**Isotope effect in carrier-envelop phase control of electron localization in dissociating hydrogen molecules**<sup>1</sup> IGOR LITVINYUK, Griffith University, Australia, HAN XU, DANE LABAN, WILLIAM WALLACE, DAVE KIELPINSKI, ROBERT SANG, Griffith University, TIANYU XU, FENG HE, Shanghai Jiao Tong University — We study dissociation of light ( $\text{H}_2$ ) and heavy ( $\text{D}_2$ ) hydrogen by few-cycle near-infrared (800 nm) laser pulses with stable carrier-envelop phase (CEP) using Reaction Microscope. We observe significant (40 percent for  $\text{H}_2$ ) CEP-dependent asymmetry in low energy (below 2 eV per fragment) dissociation channels for both molecules. By using a 50:50 mixture of light and heavy hydrogen in the target jet we can compare the spectra for the two isotopes obtained at exactly the same experimental conditions including CEP. We observe marked differences between the two molecules indicating that nuclear mass strongly affects the dynamics of electron localization. We also perform theoretical calculations using a one-dimensional two-level model, with theoretical results being in good agreement with the experimental data.

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