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Mapping Ultrafast Dynamics of Highly Excited H_2 by Attosecond VUV-Radiation[1] THORSTEN WEBER, FELIX STURM, TRAVIS WRIGHT, DIPANWITA RAY, NIRANJAN SHIVARAM, DANIEL SLAUGHTER, IRINA BOCHAROVA, Lawrence Berkeley Natl Lab, PREDRAG RANITOVIC, Extreme Light Infrastructure, ALI BELKACEM, Lawrence Berkeley Natl Lab — We show how attosecond vacuum ultraviolet (VUV) and femtosecond infrared (IR) radiation can be used to excite and map dynamics of a highly excited neutral hydrogen molecule. By using time-delayed, strong laser pulses and ion imaging, we map the dynamics of highly-excited, bound states of hydrogen molecules. Due to the large stretching amplitude of the B electronic state, excited by the 9^{th} harmonic of the fundamental laser frequency, the effective ionization potential of the hydrogen molecular ion changes substantially as the nuclear wave packet (NWP) vibrates in the bound, B potential energy curve. Therefore, the probability of ionizing the neutrally-excited hydrogen molecule by the IR probe pulse changes as the NWP evolves in the B potential. We probe this dynamics by ionizing the vibrating molecule by means of time-delayed IR radiation, and identify the dissociation channels with 3D-momentum ion imaging.

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Thorsten Weber
Lawrence Berkeley Natl Lab

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