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Control and interrogation of electronic dynamics by above-threshold ionization MARK ABEL, THOMAS PFEIFER, PHIL NAGEL, DANIEL NEUMARK, STEPHEN LEONE, Department of Chemistry, UC Berkeley — While direct interrogation of coherent nuclear dynamics has been possible for some time, only recently have the motions of valence- and core-level electrons become experimentally accessible. This access is provided by strong-field physics, through the application of high harmonic generation to ultrafast x-ray pulse synthesis. We show that another phenomenon from strong-field physics, above-threshold ionization (ATI), can yield information about electronic states and electronic dynamics without using subfemtosecond x-ray pulses. In particular, quantum beating in Xe atoms and in a 1-dimensional argon atom model show that electronic motion can be excited and interrogated in a pump-probe ATI experiment. Measurements in molecular gases show that this technique is also applicable to ro-vibrational dynamics.

Mark Abel
Department of Chemistry, UC Berkeley

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