Abstract Submitted
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**Pump-Probe spectroscopy with a femtosecond monochromatic VUV light source**[1] WEI CAO, ITZIK BEN-ITZHAK, CHARLES LEWIS COCKE, J.R. Macdonald Laboratory, Physics Dept, Kansas State University, Manhattan, KS, U.S.A — A table-top pump-probe set-up combining our Vacuum Ultra-Violet (VUV) monochrometor and cold target recoil-ion momentum spectroscopy (COLTRIMS) apparatus has been developed. High flux VUV photons are generated from a semi-infinite gas cell via high order harmonic generation. A dispersion-compensated grating pair is used to select a single harmonic with pulse duration below a 100 femtosecond. The VUV photon energy is tunable from 10 to 20 eV with a bandwidth of less than 200 meV. Such a VUV source can strongly interact with valence electrons of most molecules, thus trigger chemical reactions with well-defined time-energy information. A following synchronous infrared pulse is applied to probe or control the process. The reaction products are momentum-imaged in coincidence by the COLTRIMS system, thus enabling channel-resolved measurements. A few proof-of-principal experiments on the simplest molecular system, $D_2$, are demonstrated.

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