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Time-resolving Attosecond Chiral Dynamics in Molecules with High Harmonic Spectroscopy O. SMIRNOVA, Max-Born Insitute, R. CIREASA, LCAR, A. BOGUSLAVSKIY, U of Ottawa, B. PONS, CELIA, M.C.H. WONG, U of Ottawa, D. DESCAMPS, S. PETIT, H. RUF, CELIA, N. THIRE, INRS-EMT, A. FERRE, CELIA, J. SUAREZ, U. Autonoma de Madrid, B. E. SCHMIDT, INRS-EMT, J. HIGUET, CELIA, A. F. ALHARBI, KACST, F. LEGARE, INRS-EMT, V. BLANCHET, B. FABRE, CELIA, S. PATCHKOVSKII, MBI, Y. MAIRESSE, CELIA, R. BHARDWAJ, U of Ottawa — We demonstrate extreme chiral sensitivity of high harmonic generation from randomly oriented ensemble of chiral molecules in elliptical mid-infrared fields, and explain the physical mechanism underlying this very strong chiro-optical response. We also use the high harmonic spectra to follow the electronic chiral response with 0.1 femtosecond resolution. We studied two chiral molecules, epoxypropane and fenchone in 1.8 um, 50 fs, mid-10^{13} W/cm^2 pulses. Very small ellipticity of the incident light, about 1% in the field, is sufficient to induce several percent difference between the high harmonic response of left and right enantiomers. The origin of this effect lies in chiral-sensitive dynamics of the hole created by strong field ionization. Small differences in this dynamics between ionization and recombination are recorded and amplified by several orders of magnitude in high harmonic spectra. Using time-energy mapping we reconstruct sub-femtosecond chiral dynamics and show that the standard measure of the chiral signal is directly proportional to the recombination amplitude to the chiral-sensitive component of the hole wave-packet.

Olga Smirnova
Max-Born Insitute

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