



Sandra Beauvarlet

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Bio

BIO

Postdoctoral Researcher and Visiting Scholar specialized in ultrafast laser-matter interaction.

My PhD research focused on investigating molecular chirality through the interaction of electrons with laser pulses at the femtosecond and attosecond timescale via the PhotoElectron Circular and Elliptical Dichroism (PECD and PEELD). This finality demanded several laser source and metrology developments such as : (i) Performed frequency conversion up to the 4th harmonic of an Amplitude System Tangerine Yb-fiber short pulse laser at 1030 nm and used its Optical Parametric Amplifier to generate short pulse continuously tunable source. (ii) Engineered various polarization schemes ranging from the simplicity of 1 color pulse circularly polarized to the complexity of 2 non-collinear sets of two-color orthogonally polarized pulses with an active sub-cycle delay stabilization. (iii) Contributed to low-loss capillary-based visible pulse compression at the Yb-fiber laser's second harmonic (515nm) and built the FROG instrument to measure sub-15 fs pulses. (iv) Build and tuned UV attosecond table-top sources using the process of High Harmonic Generation (HHG). (v) Developed 2D and 3D electron spectroscopy instruments (VMI, COLTRIMS) and algorithms notably using Fourier Transform, Abel inversion, Radon transform...

My postdoctoral research focus extended to the physics of X-ray Free Electron Laser (XFEL) at LCLS and broadened to the use of these X-ray attosecond pulses to drive ultrafast dynamics in atoms and molecules. My current work and interest focus on electron/ion spectroscopy (MBES), absorption spectroscopy and X-ray diffraction probing Charge Migration, Ring Opening, Isomerization, Conical Intersections, Raman Scattering ... but also enhance the collected data quality using variability to our advantage through Covariance approaches and ghost imaging based Machine Learning procedure to improve attosecond spectroscopy.

LINKS

- My Google Scholar: https://scholar.google.com/citations?hl=en&user=SwSnKeYAAAAJ&view_op=list_works&sortby=pubdate
- My ResearchGate: <https://www.researchgate.net/profile/Sandra-Beauvarlet/stats>
- My PhD Thesis (in French): <https://theses.fr/2022BORD0005>