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Real-time observation of a correlation-driven sub 3 fs charge migration in ionised adenine

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Attosecond science is nowadays a well-established research field, which offers formidable tools for the realtime investigation of electronic processes including charge migration in bio-relevant molecules [1].

Here, I will present a time-resolved study of the correlation-driven charge migration process occurring in the DNA nucleobase adenine after ionisation by a 15-35 eV attosecond pulse. Our most intriguing observation is that a stable dication of the parent molecule can be produced if the probing NIR pulse is delayed of 2.3 fs from the XUV pulse. The delayed creation of the dication is the signature of a charge migration mechanism occurring on a sub-3 fs time scale [2].

I will then show that electronic coherences, created by a sub-2fs UV pulse [3] in the chiral molecule Methyl-lactate, can be used to modulate the chiral response of the molecule on a sub-15 fs time scale.

References

- [1] F. Calegari et al 336, Science 346 (2014)
- [2] E. Månsson et al, (Nature) Commun. Chem. 4, 73 (2021)
- [3] M. Galli et al, Optics Letters, 44, 1308 (2019)

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