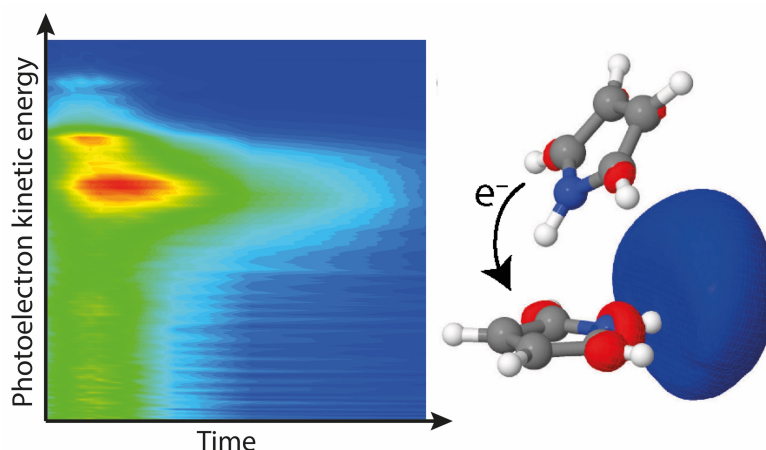


Shedding new light on photochemistry in nature: from biological motifs to photoactive protein chromophores

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Light-induced processes are ubiquitous in nature. Isolated biological chromophores are ideal starting points for studying the key elementary processes following light-absorption, free from the complications of interactions with aqueous or protein environments; however, it is important to understand the role of the environment in determining the electronic structure and dynamics. We are using a bottom-up approach to unravelling the role of the environment. Here, we begin with a description of recent work investigating the non-radiative decay dynamics of isolated small molecule chromophores^{1–3} and our identification of a new electron transfer relaxation pathway in pyrrole dimers.⁴ We then move on to describe our work probing the excited state dynamics of photoactive protein chromophores.^{5–8} Finally, we describe our progress in liquid jet photoelectron spectroscopy of small biological chromophores.

References

1. R. Spesyvtsev, O. M. Kirkby, M. Vacher, and H. H. Fielding, *PCCP*, 2012, **14**, 9942–9947.
2. O. M. Kirkby, M. Sala, G. Balerdi, R. de Nalda, L. Bañares, S. Guérin, and H. H. Fielding, *PCCP*, 2015, **17**, 16270–16276.
3. M. Sala, O. M. Kirkby, S. Guérin, and H. H. Fielding, *PCCP*, 2014, **16**, 3122–3133.
4. S. P. Neville, O. M. Kirkby, N. Kaltsoyannis, G. A. Worth, and H. H. Fielding, *Nat. Commun.*, 2016, **7**, 11357.
5. C. R. S. Mooney, D. A. Horke, A. S. Chatterley, A. Simperler, H. H. Fielding, and J. R. R. Verlet, *Chem. Sci.*, 2013, **4**, 921–927.
6. J. Tay, M. A. Parkes, K. Addison, Y. Chan, L. Zhang, H. C. Hailes, P. C. Bulman Page, S. R. Meech, L. Blancafort, and H. H. Fielding, *J. Phys. Chem. Lett.*, 2017, **8**, 765–771.
7. C. McLaughlin, M. Assmann, M. A. Parkes, J. L. Woodhouse, R. Lewin, H. C. Hailes, G. A. Worth, and H. H. Fielding, *Chem. Sci.*, 2017, **8**, 1621–1630.
8. A. V. Bochenkova, C. Mooney, M. A. Parkes, J. Woodhouse, L. Zhang, R. Lewin, J. M. Ward, H. Hailes, L. H. Andersen, and H. H. Fielding, *Chem. Sci.*, 2017, **8**, 3154–3163.