

## Ultrafast charge transfer and structural dynamics behind photomagnetism

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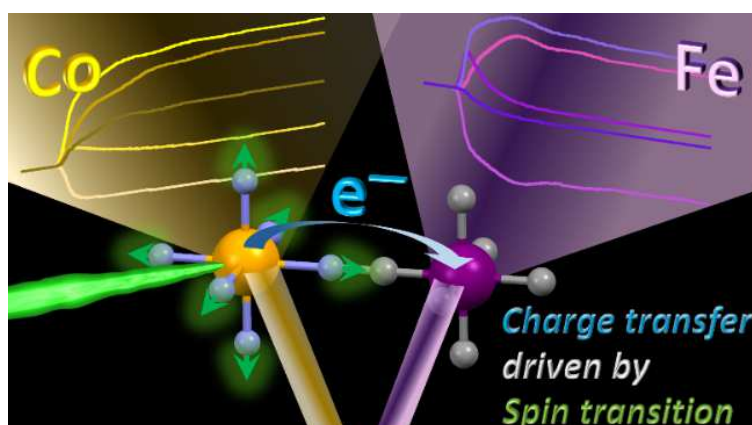
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Photoinduced charge-transfer (CT) is an important process in nature and technology, responsible for the emergence of exotic functionalities, like magnetic order for cyanide-bridged bimetallic coordination networks. Despite its broad interest and intensive developments in chemistry and material sciences, the atomic-scale description of the photoinduced process, coupling intermetallic CT and spin-transition, has been debated for decades and was beyond reach due to its extreme speed. We study this process in a prototype cyanide-bridged CoFe system by femtosecond X-ray and optical absorption spectroscopies, allowing for disentangling ultrafast electronic and structural dynamics [1]. Our results demonstrate that it is the spin-transition that occurs first on the Co site within 50 fs, which drives the subsequent Fe-to-Co charge-transfer within 200 fs. In the case of the RbMnFe Prussian blue analogue, we have shown that two photoswitching pathways exist, depending on the excitation pump wavelength, which is confirmed by band structure calculations [2,3].



**Figure 1.** Title of the figure.

[1] M. Cammarata, *Nature Chemistry*, **2021**, 13, 10-14.

[2] G. Azzolina, *Angewandte Chemie I.E.*, **2021**, 60, 23267-23273.

[3] G. Azzolina, *J. Mat. Chel. C*, **2021**, 9, 6773-6780.