

Advanced Photo-crystallography in Molecular Materials.

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Photo-Induced phase transitions¹⁻² pose challenging issues to science and science-driven technologies, the goal of which is to control with light the cooperative switching of the macroscopic physical state of a material. A better understanding of the mechanisms is necessary. Photo-crystallography may be a key issue on that purpose through the different kinds of information that can be obtained from X-Ray diffraction³ patterns: unit-cell geometries, average atomic positions, symmetry-breaking and order parameter, mechanisms of the transition (nucleation of domains *versus* homogeneous transformation), coherent processes, etc ...

A few examples of photo-induced transformations in charge-transfer molecular materials⁴ or spin-crossover compounds⁵⁻⁶, under both continuous or pulsed (down to femtosecond $1 \text{ fs} = 10^{-15} \text{ s}$) irradiation will be presented.

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4- GUERIN L. *et al.*, *Phys. Rev. Lett.* 105 246101 (2010)

5- LORENC M. *et al.*, *Phys Rev. Lett.* 103 028301 (2009).

6- BURON-LE COINTE M. *et al.*, *Phys. Rev. B* 85 064114 (2012).