Photochemical Dynamics Group

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**General area(s)**
Physical chemistry

**Research themes**
The main objective of the group's research efforts is the understanding of the mechanisms and dynamics of electron transfer processes induced by light at solid | solid and solid | liquid interfaces found in solar energy conversion devices. Systems currently under study are photo-electrodes employed in dye-sensitized solar cells (DSC), solid polymer and dye films used in organic photovoltaics (OPV), as well as organic and hybrid nanostructured charge-transporting materials.

**Methodology of work / instrumentation**
Identification of reaction intermediates and quantification of the kinetics of photoinduced reactions are provided by the application of femtosecond-, picosecond- and nanosecond pulsed laser excitation, coupled to various fast optical spectroscopy and photo-thermal techniques. The time-resolution of laser equipments allows the probing of temporal domains extending from 10 fs to 1 s. All optical wavelengths in the UV, visible, NIR, and mid-IR spectral domains, from 300 nm to 10 µm, are employed. In addition, terahertz time-domain spectroscopy (THz-TDS) allows to studying the dynamics of low frequency vibrations in molecules, solvents, solids, and supramolecular systems, as well as charge carrier mobility and transport mechanisms.

**Examples of MSc / PhD theses**
- Jan C. Brauer, EPFL MSc thesis (2008) « THz-TDS and DC conductivity study of the ionic liquid 3-methyl-1-propylimidazolium iodide as a function of iodine concentration ».