

Sensitized upconversion with sunlight

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It is well known that the efficiency of photovoltaic cells can benefit from upconversion of sub-bandgap light. Upconversion by triplet-triplet-annihilation is a very promising mechanism for this application. It employs two molecular species, one of which emits higher energy photons via fluorescence upon triplet-triplet-annihilation, whereas the second species sensitizes this process by supplying excitations for the annihilation process. These sensitizers absorb low energy photons with an efficiency that enables successful upconversion already with incoherent sunlight. In my talk, I will give a short introduction to the topic, characterize the transport phenomena in state-of-the-art upconversion materials and present ways to further improve the efficiency of the upconversion process.

Presenter: ZIMMERMANN, Jochen (University of Freiburg)

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