

## PHYSICAL COLLOQUIUM

## INVITATION

Monday, 20.05.2019, 4.15 p.m., W2-1-148

speaks

Dr. Tiago Buckup Physicochemical Institute (PCI), University of Heidelberg

about

## "Time-Resolved Spectroscopy of Intramolecular and Intermolecular Singlet Fission"

According to Shockley and Queisser, single-junction solar cells can reach a maximum quantum efficiency of 34%.<sup>1</sup>The limit is essentially imposed by the waste as heat of photon energies exceeding the bandgap. Carrier multiplication mechanisms are hoped to minimize losses by using UV-Vis photons to generate two charge carriers of half-energy. Singlet Fission (SF), the process by which a singlet exciton is converted into two triplet states of nearly half energy, is being addressed in this context. Initially discovered in anthracene and tetracene crystals, SF has been observed in a rapidly increasing number of molecules. <sup>2</sup>Synthesis of new materials and device architectures aim to further improve yield and chemical stability. SF for several acene families is here studied by time-resolved spectroscopy in different environments: thin films, covalently-bound dimers and solutions. <sup>3-5</sup> A novel oxygen-catalyzed sequential mechanism is demonstrated.

- 1. W. Shockley and H. J. Queisser, J Appl Phys, 1961, 32, 510.
- 2. M. B. Smith and J. Michl, Chem Rev, 2010, 110, 6891-6936.
- 3. J. Herz, T. Buckup, F. Paulus, J. U. Engelhart, U. H. F. Bunz and M. Motzkus, J Phys Chem A, 2015, 119, 6602-6610.
- 4. J. Herz, T. Buckup, F. Paulus, J. Engelhart, U. H. F. Bunz and M. Motzkus, J Phys Chem Lett, 2014, 5, 2425-2430.
- 5. N. Alagna, J. Han, N. Wollscheid, J. L. P. Lustres, J. Herz, S. Hahn, S. Koser, F. Paulus, U. H. F. Bunz, A. Dreuw, T. Buckup and M. Motzkus, Journal of the Americal Chemical Society, 2019 (Submitted).All interested

All interested persons are cordially invited.

Sgd. Prof. Dr. Matthias Wollenhaupt