Carl von Ossietzky
Universität
Oldenburg
Institut für PHYSIK

PHYSICAL COLLOQUIUM

INVITATION

Monday, 17.05.2021, 4.15 p.m.,
video conference: https://meeting.uol.de/b/anj-2vc-j6s-fwe

speaks

JProf. Dr. Katharina Broch

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About

"Singlet fission in organic semiconductor blends"

Singlet fission, which is the photophysical process in which an excited singlet state on one molecule is transformed into two excited triplet states on neighboring molecules, has the potential to significantly boost solar cell efficiencies and, thus, has received increasing attention in the last decade.

One research focus lies on the impact of intermolecular interactions and (virtual or real) charge transfer states on singlet fission as a possible way towards the synthesis of singlet fission capable organic molecules. However, the details of the interplay between interaction strength and singlet fission rates are still unclear. To obtain further insight into these mechanisms, the targeted modification of intermolecular interactions is a promising approach. So far, this is mainly achieved via side chain modification or in chemically linked dimers. The talk will focus on an alternative approach which is based on blends of singlet fission chromophores.

In a first example, singlet fission of chromophores in blends with weakly interacting spacer compounds is discussed. Codeposition leads to the formation of mixed films with well-defined long-range order and reduced intermolecular interactions, which can be tuned easily over a wide range and for which the Davydov-splitting is a convenient metric. The impact of changes in electronic coupling on the singlet fission rate will be rationalized in the context of different singlet fission mechanisms. In a second example it will be discussed how blends of singlet fission chromophores allow to study heterofission, i.e. the spontaneous fission of a singlet exciton into triplets on chemically distinct molecules and how this is affected by charge transfer between the two compounds involved. Lastly, strongly interacting donor/acceptor blends are given as an example for which charge transfer complex formation prevents singlet fission of tetracene.

All interested persons are cordially invited.

Sgd. Prof. Dr. Caterina Cocchi