***EXTRAORDINAIRE:* Addressing the most pressing question of solar energy conversion with organic solar cells**

2 Ph.D. Positions in Organic Photovoltaic Research

The University of Potsdam (Prof. Neher and Prof. Shoaee) and the University of Erlangen (Prof. Brabec) invite applications for 2 experimental Ph.D. positions in the field of photophysics and optoelectronics of non-fullerene acceptor solar cells. We are seeking two excellent graduates in Physics, Chemical Physics, or Materials Science. Each Ph.D. position is for three years, starting from 1st of September 2021, with the possibility of extension by a year.

The recent development of non-fullerene acceptors (NFAs) has been a game changer in the field. State of the art organic solar cells exhibit power conversion efficiencies of 18 % and above. Profiting from the strong excitonic absorption of these novel acceptors, NFA-based organic solar cells nowadays match their inorganic competitors in terms of current production. On the other hand, the excitonic nature of the primary photoexcited state requires an energy at the donor-acceptor interface to generate free charges, which in turn causes severe energy and photovoltage losses. This raises the question which fundamental processes limit the achievable photovoltage in state of the art OSCs and whether devices with even zero driving force may become feasible upon proper design of the NFA.

In the EXTRAORDINAIRE project, funded by the German Science Foundation, our groups at the University of Potsdam and the University of Erlangen will join forces together with the Andrienko-group at the Max-Planck Institute of Polymer Research, Mainz, to address this holy grail of organic photovoltaic research. To this end, we apply time resolved photoluminescence, femtosecond transient absorption spectroscopy, temperature and field dependent time delayed collection field and quasi-steady-state photoinduced absorption spectroscopy to polymer:NFA donor-acceptor systems of well-defined energetics and morphology. The unique combination of these transient and steady-state techniques, along with computational modelling, will provide detailed insight into the dynamics of excitons, interfacial excitations and free charges. Specially, by clarifying the role of the quantum characteristics in key photovoltaic processes, we aim at developing strategies to realize efficient organic solar cells with minimum energy offset.

The successful candidates will participate in the experimental investigations, and contribute to the development of models of charge generation and recombination in NFA based solar cells. This project will involve working together with other nationally- and internationally renowned groups in the field. The ideal candidate will have a BSC and MSc in Physics, physical chemistry, material science or equivalent and be experienced in the preparation and

characterization of organic solar cells. We especially welcome applications from female applicants.
Please send your application (including a short motivation letter, your CV and your publication list) via email to neher@uni-potsdam.de for Potsdam and to christoph.brabec@fau.de for Erlangen. The closing date is 30th of June 2021

Preferred skills and experience for both positions:

- Knowledge of condensed matter physics, photophysics, optoelectronic properties of semiconductors, and semiconductor device physics.
- Experience in spectroscopic techniques.
- Experience in the use of programs to perform and analyse experiments, such as LabVIEW, Python or Matlab™ is highly welcomed

University of Potsdam:
The groups of Prof. Dieter Neher and Prof. Safa Shoaee at the Institute of Physics and Astronomy of the University of Potsdam have pioneered various techniques to study free charge generation and recombination in NFA-based optoelectronic devices. These studies revealed the critical processes involved in photocurrent and photovoltage losses and how they are related to the energetics and morphology of the photoactive blend. Knowledge gained from these studies led to devices with state of the art efficiencies.

For contact and further information:

Prof. Dr. Safa Shoaee (shoai@uni-potsdam.de).
Prof. Dr. Dieter Neher (neher@uni-potsdam.de).

https://www.uni-potsdam.de/de/pwm/index
https://www.uni-potsdam.de/en/optoelectronics/index

University of Erlangen:
The group of Prof. Christoph Brabec at the Institute of Materials for Electronics and Energy Technology (i-MEET) at the University of Erlangen has developed highly reproducible preparation methods for photovoltaic blends with NFA materials with defined donor-acceptor interface structure. Fingerprints from steady-state and dynamic (down to femtoseconds) optical spectroscopy can thus be directly related to microscopic structure.

For contact and further information:

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Dr. Larry Lueer (larry.lueer@fau.de)
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https://www.i-meet.ww.uni-erlangen.de/