PhD Student Position

Hybrid Solar Cells based on Perovskite Materials

Motivation
During the last few years, exceptional results have been reported for a new type of hybrid solar cells based on organometallic perovskites. With a current record efficiency of 21% after a very short research time span, perovskite based solar cells are among the most promising candidates for the large scale thin-film photovoltaic development. Their ease of fabrication, low cost manufacturing and band gap tunnability make them as ideal candidates for boosting the photovoltaic efficiency and production and enables the fabrication of perovskite semiconductor-based tandem solar cells with an optimized overlap between the absorption range and the sun spectrum. However, one of the main drawbacks of the standard and most investigated compounds CH3NH3-PbI3 is the presence of the toxic element lead. Therefore, a partial or complete replacement of this metal by a non-toxic alternative is an important topic for future research.

Task
Within a collaboration with several research groups based on a third-party funding project, we investigate the different aspects of perovskite based solar cells ranging from device production and optimization to the understanding of the underlying mechanisms that are responsible for the photocurrent generation and the anomalous effects observed in the perovskite based solar cells.

The aim of the PhD thesis is to further develop the device optimization by substituting the lead and to gain deeper understanding of the material properties. The PhD candidate will cooperate with the project partners by characterizing and introducing novel lead free materials into working devices. The fundamental characterization and the study of the optoelectronic properties of the devices will be carried out within a multidisciplinary team where established and available experimental methods and theoretical simulation and models will support the candidate’s own research.

Prerequisites
Enthusiasm for research. Background in physics, material science, electrical engineering or related areas. Excellent academic record.

Please send your CV and transcripts together with your cover letter to aina.quintilla@kit.edu

Location
Light Technology Institute
KIT, Campus South

Educational background
Physics
Electrical engineering
Material science

Entry date
As soon as possible

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