

PhD Student in Nanowire Hot Carrier Solar Cells

fixed-term (3+ years / TV-L E13) starting 2022

The **Semiconductor Quantum Nanomaterials Group** at the Walter Schottky Institute (WSI), Technical University of Munich (TUM) is looking for a doctoral student (m/f/d) in the field of advanced-concept solar cells for third-generation photovoltaics. The position is for a limited period of 3 years with possible extensions, and the candidate is expected to develop new forms of 3D-structured nanowire solar cells and explore key physical principles under diverse structure-property-function correlation studies.

Project background

Photovoltaic (PV) solar cells are amongst the fastest growing renewable energy sources available today, yet new disruptive concepts with ultrahigh conversion efficiencies are needed due to the dilute solar energy incidence. Hot-carrier solar cells (HCSC) are such new devices with prospective conversion efficiencies far beyond the Shockley-Queisser limit, as they counteract the large thermal losses in photo-excited carrier generation. Development of HCSCs increasingly exploits novel semiconductor materials and heterostructures in advanced architectures, to meet the different demands in every step of the photo-conversion process.

Job description

The aim of this PhD project is to combine the prospects of harvesting strong hot carrier effects in 1D-semiconductor heterostructures with the beneficial architectural design structure of third-generation nanowire solar cells. Key roles will be to design and synthesize low-bandgap semiconductor nanowire arrays with tailored electronic properties and hot carrier relaxation dynamics, perform structure-property relationship investigations, and explore the fabrication and photo-physical characterization of functional hetero-diode structures at both the single object and array-dimensional level. Close collaboration will be envisioned with teams in the Walter Schottky Institute and Center for Nanotechnology and Nanomaterials, as well as with groups in advanced pump-probe spectroscopy and theory.

Candidate profile:

Candidates are expected to hold a M.Sc. degree in physics, electrical engineering, materials science or similar with outstanding academic record and should possess exceptional motivation and creativity combined with very good communications skills and proficiency in English (oral and written). A strong background in semiconductor-based materials synthesis and processing is an advantage. Knowledge in structure-property studies, state-of-the-art cleanroom fabrication and optical spectroscopy is considered an asset. Hiring will start immediately (01/2022).

Interested applicants should submit their application including cover letter (motivation), CV, list of 3 references and relevant documentation (transcripts, certificates) to the PI of the project by **Email: Gregor.Koblmueeller@wsi.tum.de**
PD Dr. Gregor Koblmüller, Walter Schottky Institut, TUM, www.wsi.tum.de

