



**Bachelor Thesis Work**

**Invitation**

**Concept Study of a Perovskite Photovoltaic Application for the Small Satellite ROMEO**

Motivation:

Organic-inorganic metal halide Perovskites are currently in the focus of semiconductor research, promising to deliver the next generation of highly efficient and inexpensive photovoltaic systems. In under 10 years, prototype devices prepared on a lab scale demonstrated power conversion efficiencies (PCE) of over 25 % (find: NREL Best Research-Cell Efficiency Chart). The benefit of this type of solar cells lies in their high specific power (power per mass) due to their possible fabrication on thin, flexible, and lightweight polymer foils. For this reason, this type of solar cells is suitable for space applications. In this bachelor thesis the focus lies on investigating the potential use of Perovskite solar cells on space missions. Challenges like their suitability and performance in the outer-space environment need to be further assessed in this thesis, for the implementation of this new type of solar cells on space missions. In the next step, the requirements for space applications are to be derived from this assessment. Finally, a concept for a Perovskite solar cells demonstration/characterization unit on the small satellite mission ROMEO (Research and Observation in Middle Earth Orbit) of the University of Stuttgart needs to be developed. Herein, possible cell structures shall be proposed, and the characterization measurement unit is to be preliminary designed in accordance with the ROMEO mission requirements.

Task description of the Bachelor thesis work:

- Familiarize with the topic of Perovskite solar cells and their space applications
- Compare Perovskite solar cells with standard space solar cells (literature research)
- Develop requirements of Perovskite solar cells for space applications
- Prepare a concept for the demonstration and characterization of Perovskite solar cells on the satellite ROMEO
- Document the work

The thesis will be accomplished at the Institute of Photovoltaic of the University of Stuttgart

Internal supervisor: Dr.-Ing Michael Lengowski

External supervisor: Dr.-Ing. Claudiu Mortan

Starting date: as soon as possible

Submission until: 4 months after start

**Acknowledgement of receipt:**

I hereby confirm that I read and understood the task of the master thesis, the juridical regulations as well as the study- and exam regulations.

Date	Date	Date
Prof. Dr.-Ing. Sabine Klinkner (Responsible Professor)	Prof. Dr. Michael Saliba (Co-Examiner)	Signature of the student

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