

# Looking for a Master's Thesis?



## From Lab to Launch: Vibration-Induced Failure of Perovskite Solar Cells in Space

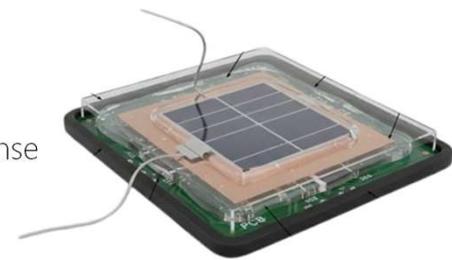
**Project Summary:** This master's thesis investigates the mechanical reliability of perovskite–silicon tandem solar cells under vibration loads representative of aerospace and satellite launches (e.g., Falcon 9 profiles). The goal is to reveal vibration-induced failure mechanisms and develop more robust device and packaging designs for Low Earth Orbit (LEO) applications.

### Project Description

You will develop and test encapsulation strategies, perform vibration experiments using an electrodynamic shaker, and characterize device performance before and after testing. Mechanical weak points will be identified through adhesion/delamination tests and advanced diagnostics such as laser vibrometry and high-speed imaging. Measured material properties will be used to build finite element (FE) models, and ANSYS simulations will help analyze stress, delamination origins, and critical failure points.

### Key Responsibilities

- Develop and evaluate encapsulation and packaging strategies
- Perform vibration tests with a computer-controlled shaker
- Characterize device performance (IV, EQE) pre- and post-vibration
- Conduct adhesion and delamination tests
- Use laser vibrometry & high-speed imaging to capture mechanical response
- Measure mechanical properties of key materials
- Build FE models and run ANSYS simulations
- Compare experiments with simulation results



### Outcome & Impact

This project will identify dominant vibration-induced failure pathways in tandem solar cells and guide the design of mechanically robust devices for future satellite and space-PV systems.



Technical  
University  
of Munich



*This thesis will be jointly co-supervised by the Chair of Applied Mechanics at TUM and the Aydin Group in the Department of Chemistry at LMU Munich.*

## Interested?

Dr.-Ing. Michael Häußler michael.haeussler@tum.de  
Dr. Erkan Aydin erkan.aydin@cup.uni-muenchen.de

**Application deadline: 27<sup>th</sup> Februar 2026**

Learn what we do at LMU →



SCAN ME

Briefly, we work on state-of-the-art, high-efficiency lead-based perovskite solar cells, with a focus on tandem architectures for space applications—particularly for low Earth orbit telecommunication satellites. We develop solar cells that are resilient to the extreme conditions of space through a multifaceted approach. This is a highly interdisciplinary topic, requiring collaboration among mechanical-electronics engineers, materials scientists, and experts in fundamental domains such as physics and chemistry.