

## Design and Implementation of a Langmuir Probe as a Diagnostic for a Helicon-based Plasma Thruster

The Collaborative Research Centre 1667 "Advancing Technologies of Very Low-Altitude Satellites (ATLAS)", funded by the German Research Foundation DFG, addresses the fundamental scientific and engineering challenges of rendering Very Low Earth Orbit (VLEO, about 200 km to 450 km altitude) accessible. These orbits are particularly beneficial for indispensable satellite services of our modern knowledge, information and communication society as well as reduce space debris contamination in higher orbits.

VLEO offers unique advantages for satellite missions, but atmospheric drag at these altitudes can cause rapid orbit decay. The Helicon-based Plasma Thruster (IPT), developed by the Institute of Space Systems under the EU DISCOVERER project, provides a promising solution with its atmosphere-breathing electric propulsion (ABEP) technology. This propulsion approach uses atmospheric gases as propellant, extending mission lifetimes without onboard propellant. Ignition and operation of the IPT have been successfully carried out, using Ar, N<sub>2</sub> and O<sub>2</sub> as propellant. The developed IPT is under extensive plasma plume characterization in the frame of the ESA project Ram-CLEP. Plume properties such as electron temperature and density are crucial when combined with other diagnostic measurements for understanding the incident plasma plume's physics. These measurements can be obtained via a Langmuir probe, which is an electrode that can measure current and potential inside a plasma. We are currently looking for a motivated student to contribute to our research!

### Your tasks

- Assisting in research of Langmuir measurement techniques
- Design, manufacturing & calibration of a triple Langmuir probe system
- Support test campaigns including commissioning and application of a calibrated Langmuir probe
- Post-processing, validation of the received data and documentation

### What we offer

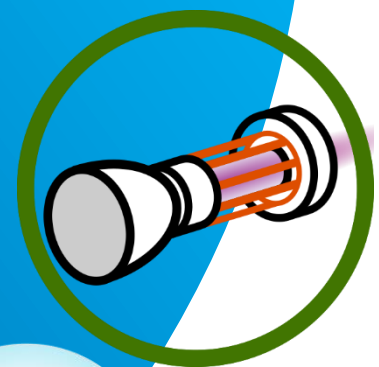
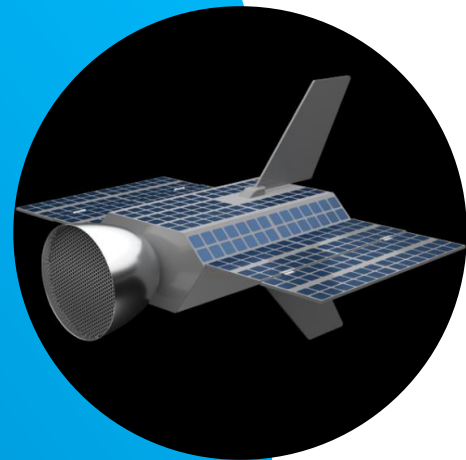
- Opportunity to develop expertise in plasma diagnostics and hands-on experience with ABEP technologies
- Opportunity for theses and contribution to publications
- Student assistant contract, flexible working hours and remote work possible

### Contact:

Apl. Prof. Dr.-Ing. Georg Herdrich  
[herdrich@irs.uni-stuttgart.de](mailto:herdrich@irs.uni-stuttgart.de)  
Institute of Space Systems

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## Student Assistant Opportunity



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