



INSTITUT FÜR  
UMWELTPHYSIK



UNIVERSITÄT  
HEIDELBERG  
ZUKUNFT  
SEIT 1386

# Master's Thesis (several candidates)

## A novel spectroscopic measurement technique for solar-induced chlorophyll fluorescence

Photosynthesis encompasses a series of physiological processes initiated by the absorption of solar radiation by chlorophyll molecules in plants. However, a fraction of the absorbed photons is re-emitted upon molecule relaxation, resulting in the fluorescence of chlorophyll. Solar-induced fluorescence of chlorophyll (SIF) is thereby linked to plant physiological processes, which determine the plant's CO<sub>2</sub> uptake and indicate plant health. Remote quantification of SIF can provide non-invasive in-situ insight into plant physiology in real-time. It has been proven highly beneficial for studies of biosphere-atmosphere interactions and offers new opportunities for crop and ecosystem monitoring in efforts to mitigate climate-related environmental changes. However, current approaches to measuring SIF are complicated and cost-intensive and, thus, preclude the scalability required by most scientific or agricultural applications.



As a member of the dynamic and collaborative research group **Atmosphere and Remote sensing** at the **Institute of Environmental Physics**, you will contribute to the development of a novel SIF remote sensing technology and its application in environmental measurements. Depending on your skills, interests, and start date, the thesis may include: (1) prototype design, assembly, and characterization; (2) development of a numerical instrument model; (3) design and execution of laboratory and field experiments; and (4) evaluation of field data.

A strong motivation to engage in pioneering, interdisciplinary, and methodologically diverse research, together with a full-time commitment to the project, is essential. Prior coursework or practical experience in optical spectroscopy, environmental and atmospheric physics, remote sensing, and radiative transfer are preferred.

### Contact

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