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UNIVERSITÄT
BERN

Institute of Applied Physics

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Master and Bachelor Theses in Microwave Remote Sensing

The Microwave Physics group at the Institute of Applied Physics develops sensitive millimeter wave radiometers for atmospheric remote sensing applications and uses them to study stratospheric ozone, water vapor, temperatures and winds. We are also developing the optics and blackbody calibration targets for different space missions, including the the THz sounder SWI on the ESA Jupiter mission JUICE and the Arctic Weather Satellite AWS.

We currently offer Master and Bachelor projects on the following topics:

- Thermal simulations of the blackbody calibration target of the SWI instrument on the Jupiter mission JUICE, and correlation of the simulation results with measurements on the spacecraft which was launched April 2023.
- Optimization of corrugated horn antennas for a weather satellite
- Remote sensing of precipitation with a micro rain radar
- Weather Research and Forecasting model (WRF): idealized case simulation of turbulence and water vapour fluctuations
- Two MSc/BSc projects in collaboration with MeteoSwiss, Payerne: Analysis of Ozone time series and polarimetric calibration of a Raman LIDAR
- Investigation of Arctic dynamics and its relation to ozone and water vapor observed with our GROMOS-C and MIAWARA-C instruments on Svalbard
- Gravity wave analysis from tomographic 3DVAR retrievals using multi-static meteor radar networks
- Studying of Mesospheric/Stratospheric dynamics above the alpine region using the wind radiometer WIRA-C and its impact on trace gases
- Full wave scattering modeling of meteoric plasmas and analysis of meteor radar data
- Implementation of a software defined radio (SDR) receiver for passive radar observations of satellites and meteors
- Interferometric observations with the two radio telescopes on the ExWi roof.

For more information, please contact the head of the IAP Microwave Physics Division, Dr. Axel Murk.