

## Seminar über Microwave Physics and Atmospheric Physics

**Referent/in:** Witali Krochin, IAP, University of Bern

**Titel:** Ground-based temperature remote-sensing in the middle atmosphere

The dynamic of the middle atmosphere (30-60 km altitude) affects the global as well as the local weather. A deep understanding of the effects at these altitudes is crucial to improve atmospheric and climate models.

Continuous temperature observations in the middle atmosphere with a high temporal resolution however are rare. Satellite measurements provide global coverage, but have a limited temporal resolution at certain geographic locations due to the orbit geometry. TEMPERA is a ground-based TEMperature RAdiometer developed at the University of Bern and did perform first observations in 2012. It measures microwave radiation coming from atmospheric oxygen in a range between 52-53 GHz. A mathematical inversion process, called "Retrieval" allows to invert the measured spectrum into an atmospheric temperature profile. Measurement time series from 2014-2017 showed an effective altitude range of 20-55 Km for the performance of TEMPERA with single polarization measurements. Performing a full polarization analysis (decompose the measured radiation into its polarization components) could even improve this altitude range. Focusing only on the middle atmosphere a time resolution of about 1 profile per 30 min can be reached. In the talk I will describe how a radiometer works and which factors determine atmospheric microwave radiation. I also will explain the main mathematical principals for inverting an emission spectrum and give an outlook about what can be reached with a full polarization analysis. Furthermore I will give a short motivation about what we can do with such high resolution measurements.

**Zeit:** Freitag, 1. Oktober 2021, 10:15 Uhr

**Ort:** Raum A97, ExWi, Sidlerstrasse 5, 3012 Bern  
<https://unibe-ch.zoom.us/j/97081325603?pwd=d0ozME5xOS9pQVNxallLem81VHQyZz09>  
Meeting ID: 970 8132 5603  
Passcode: iapmw