

## Einladung zum Physikalischen Kolloquium

28.06.2024 **Ali Hoshyaripour, IMK-TRO, Karlsruher Institut für Technologie**  
**»Bridging Scales in Atmospheric Aerosol Modeling«**

*Einführung: C. Hoose*

Atmospheric aerosols play a crucial role in Earth's energy balance, interacting with radiation and clouds, thus influencing both weather and climate. This perturbation effect manifests differently at regional and global scales, impacting weather patterns and renewable energy generation in the short term, while shaping the climate system over longer periods. However, uncertainties in regional and global predictions primarily stem from the diverse properties of aerosol particles, especially at Micro-scales.

In this presentation, we address this challenge by integrating recent advancements in aerosol property understanding into the atmospheric modeling framework ICON-ART (ICOsahedral Nonhydrostatic model with Aerosols and Reactive Trace gases). This integration facilitates a comprehensive treatment of aerosol processes and interactions across scales. Leveraging natural experiments such as desert dust outbreaks and volcanic eruptions, we precisely quantify the influence of different aerosol properties and processes on their evolution and impacts.

The findings highlight the critical role of aerosol processes and properties at the micro-scale in enhancing three key aspects of atmospheric modeling: dispersion modeling, weather forecasting, and renewable energy prediction. By capturing variations in aerosol properties, we can improve the accuracy of dispersion models, enabling better assessment of pollution dispersion. Moreover, integrating aerosol processes and properties into weather forecasting models enhances our ability to predict weather phenomena at regional scale. Additionally, aerosol representation holds promise for optimizing renewable energy prediction models, particularly for photovoltaic energy generation, by improving the assessment of solar radiation. In summary, a comprehensive treatment of aerosol processes and properties at the micro-scale is essential for advancing dispersion modeling, weather forecasting, and renewable energy prediction, ultimately contributing to more accurate and reliable atmospheric simulations and predictions.

Der Vortrag findet **am Freitag, den 28. Juni 2024 um 15:45 Uhr im Otto-Lehmann-Hörsaal**, Physik-Flachbau (Geb. 30.22), KIT-Campus Süd statt.