

The Research Group of Cloud Microphysics at IMKAAF invites applications for a PhD student position (f/m/d) within the DFG-funded research project “Secondary ice production mechanisms: rime splintering and droplet shattering on freezing”

Reliable modeling of cloud processes for weather predictions and climate change projections requires a sound understanding of the ice formation in mixed-phase clouds. Typically, ice particles form via heterogeneous freezing of supercooled cloud droplets containing ice nucleating particles (INPs). Ice crystal concentrations measured inside the clouds are often found to exceed the concentration of INPs by many orders of magnitude. To explain this discrepancy, the Secondary Ice Production (SIP) mechanisms, i.e., processes producing multiple ice particles upon freezing of a single cloud droplet or by fragmentation of existing ice particles, must be studied.

In a DFG-funded collaborative project between the Institute of Meteorology and Climate Research (IMK) and the Leibniz-Institute for Tropospheric Research (TROPOS) in Leipzig, we are investigating two potential SIP mechanisms: production of secondary ice particles caused by (A) droplet-ice collisions (rime-splintering) and (B) splintering of freezing droplets (see Figure 1). These two SIP mechanisms have been suggested to be of particular relevance in the mixed-phase clouds.

The IMKAAF seeks a highly motivated PhD student (f/m/d) to work on the experimental investigation of droplets splintering on freezing. The successful candidate will conduct experiments with the new experimental set-up, the Ice Droplet splintEring and Fragmentation eXperiment (IDEFIX); will participate in experiments on identification of the physical mechanisms of rime-splintering SIP events together with the leading scientists at TROPOS; will contribute to parameterization development for both SIP mechanisms; and will take part in the measuring campaign investigating SIP in mix-phase clouds. The parameterizations developed as a part of this PhD project will be applied for representation of SIP mechanisms in cloud microphysics resolving models.

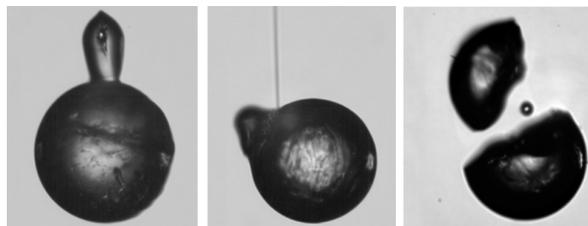


Figure 1. High-speed video frames of secondary ice production events. From left to right: spicule formation upon internal pressure rise; liquid jet emerging from a freezing droplet; splintering of a freezing droplet.

The required qualifications are:

- M.Sc. degree or equivalent in physics, environmental physics, geophysics or meteorology
- Experimental skills and motivation to work in the lab
- Good communication skills, fluent English language in writing and speaking

If you are interested in joining our highly motivated team to perform cutting-edge research in a stimulating international working environment, please send a cover letter including a short statement about your research interests; a full CV including publication list; names and contact information of 2 references; copies of relevant certificates to Dr. Alexei Kiselev. Applications will be considered until the position is filled; the earliest date of the project start is November 1st, 2025, with the estimated duration of 36 months. The position will be funded according to German salary regulation TV-L E13 at 75% full time equivalent.

KIT is an equal opportunity employer. Women are especially encouraged to apply. Applicants with disabilities will be preferentially considered if equally qualified.

Contact person at KIT:

Dr. Alexei Kiselev, Tel: 0721/ 608-26662, E-Mail: alexei.kiselev@kit.edu, web: www.imk-aaf.kit.edu