





Master Thesis for Telecommunication Engineering: Snowmelt sensing using arrays of passive wireless microwave sensors

Snow is made up of air, ice crystals, and sometimes melted or precipitated water. The proportion of liquid water in snow-or wetness-is an important parameter for predicting snowmelt infiltration and wet-snow **avalanches**. Snow wetness can vary significantly over time and space. Manual wetness measurements used today are destructive, time-consuming, and not very accurate. We developed a sensor system that tracks snow mass and temperature with RFID tags, and will also measure snow wetness from the signal attenuation on the tags.

The thesis aims to develop a new method for measuring snow wetness with those RFID sensors. You will conduct experiments in a cold laboratory to build and calibrate an empirical model. Then, you will apply the model to a full winter field dataset and compare the results with ground-truth data. Moreover, during the winter season, you will perform weekly snowpack measurements.

The project combines **geophysics**, **microwaves**, **and snow science**. It involves **laboratory experiments**, **fieldwork**, **and Python analysis**. Physics, geophysics, telecommunications, or snow science background preferred. Fluency in English required, proficiency in German or French a plus. **Skiing experience** and ability to work in harsh winter conditions are required.

The project would last **4** – **6 months**, starting ideally in **February 2025**. Hosted by the «Avalanche Formation and Dynamics» team at SLF, Davos, Switzerland. The project is in collaboration with partners (ISTerre, LCIS) near Grenoble, France. **Free accommodation is provided in a shared flat at SLF in Davos.**

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