

## **Student Project**

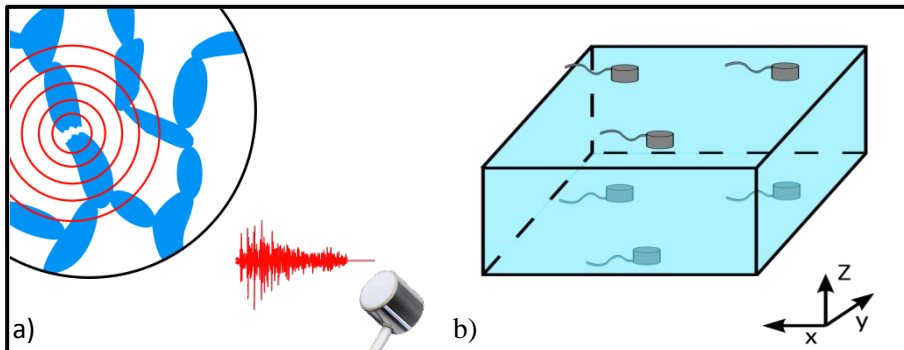
### **Localization of acoustic emissions during snow failure experiments**

Acoustic emissions (AE) generated by bond failure or crack formation allow for non-destructive observation of the progressive failure of snow. We performed loading experiments on snow samples and monitored the AE activity before failure. Recording the AE with multiple sensors and using triangulation methods we aim to localize the AE sources and hence to map the spatial distribution of damage before failure (Fig. 1). However, waves propagating in a highly porous material such as snow are strongly attenuated and distorted, making the localization a challenging task.

The aim of the project is to improve the efficiency and precision of the localization of AE in snow. The student will improve the existing method and search for valid alternatives in literature. The feasibility of the methods will be tested with laboratory experiments and applied on the snow loading experiments.

The following task should be addressed (to be accomplished according to the project duration):

- Develop and test an experimental validation method. It will be necessary to find well-defined artificial AE at known locations in the snow sample.
- Improve the existing localization method or adapt alternative methods to snow.
- Test the feasibility of the proposed methods with the validation experiments.
- Apply the best working methods on the snow loading experiments.



**Figure 1:** a) Illustration of the generation and detection of AE in snow. b) Example of snow sample with six sensors used for the localization of the AE.

The Project will take place at the WSL Institute for Snow and Avalanche Research SLF in Davos.

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