

# Calibration of the Radio Neutrino Observatory Greenland using thermal noise



Ruben Camphyn\*, F. Schlüter\*, S. Toscano\* for the RNO-G collaboration

ruben.camphyn@ulb.be

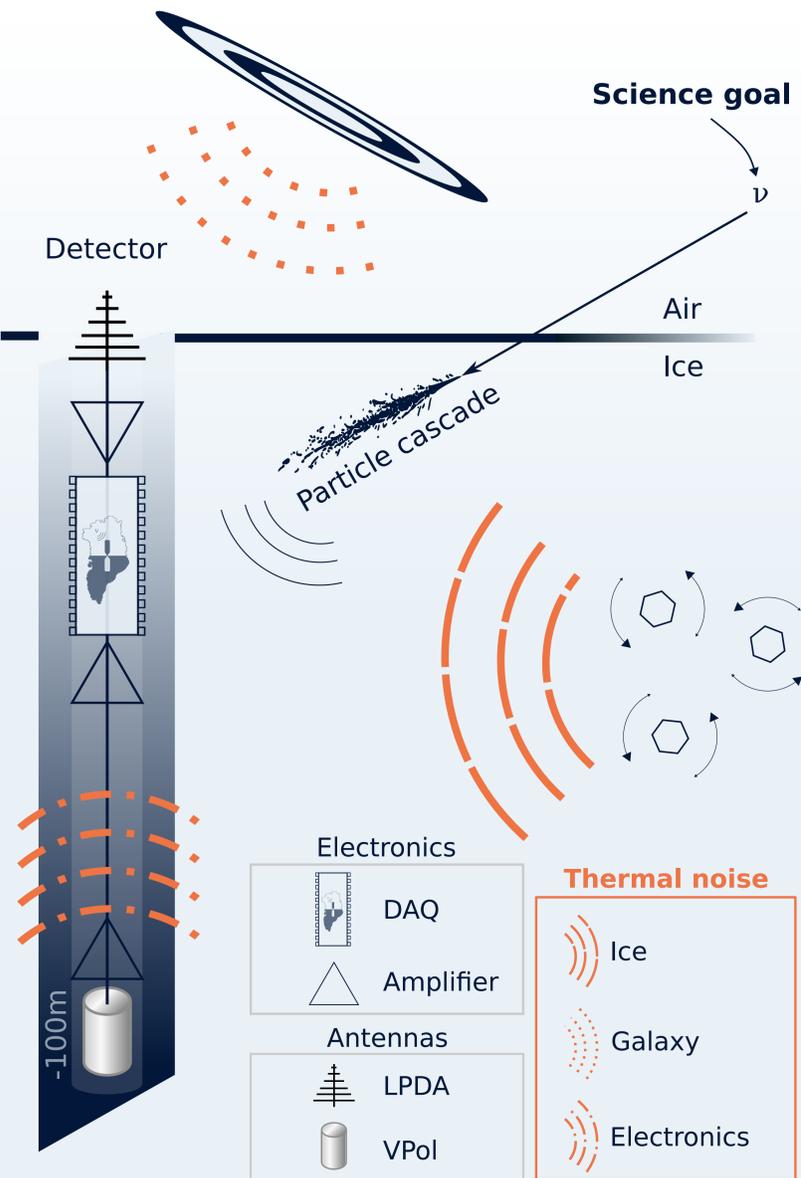
\* Interuniversity Institute for High Energies Université Libre de Bruxelles

## Goal

Obtain end-to-end in-situ absolute amplitude **system response calibration**

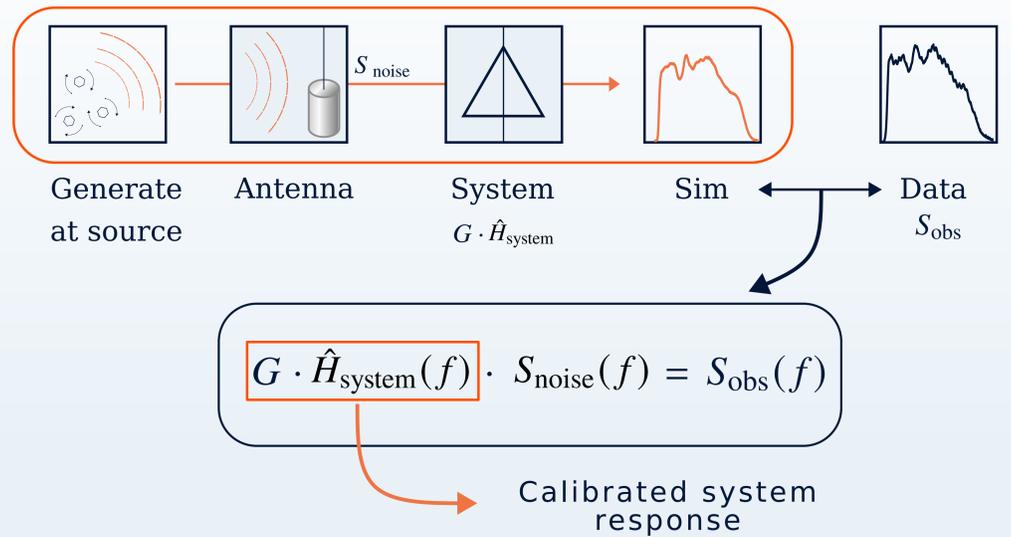
## Experiment

RNO-G system schematic [1]



## Methodology

- Simulate thermal noise sources  $S_{\text{noise}}$
- Fold through normalized system response  $\hat{H}_{\text{system}}$
- Fit to data to obtain absolute amplitude  $G$



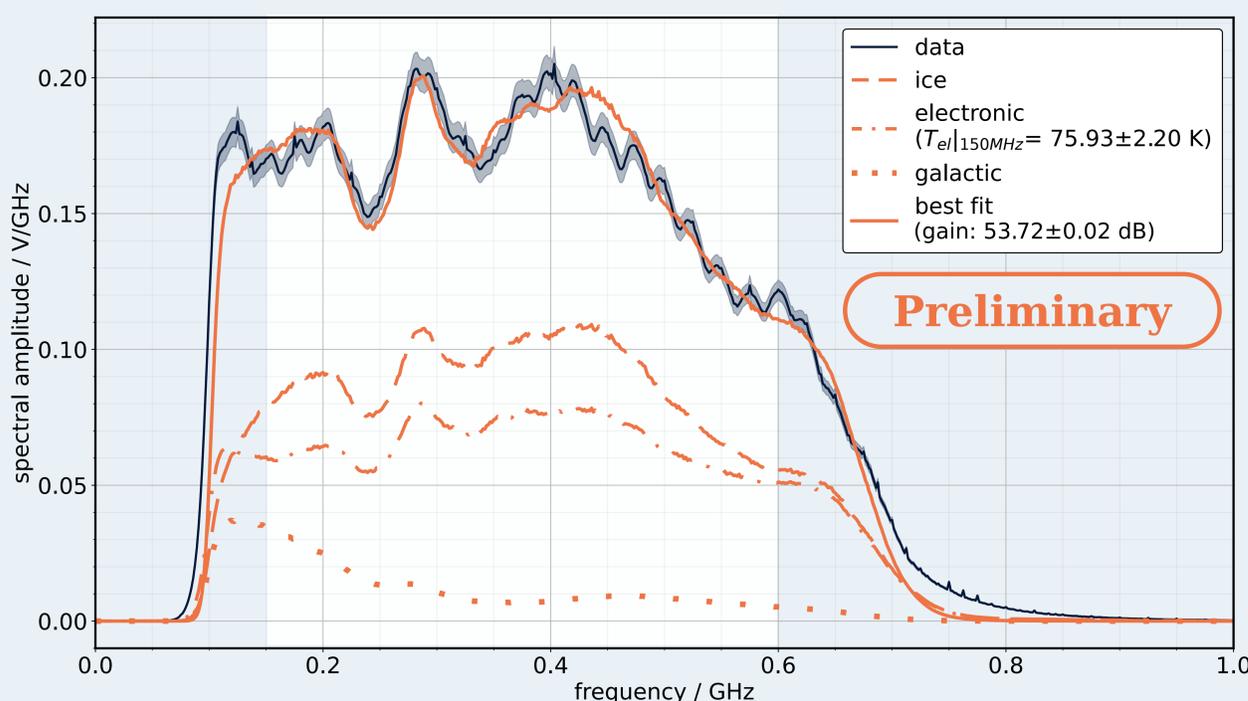
## Simulation

- Identify **3 thermal noise sources**:  
Thermal radiation from surrounding **ice**  
**Galactic** radio background  
**Electronic** noise
- Fold in antenna and detector response
- Simulated using NuRadioMC [2]

## Data

- Assume ambient background is thermal noise
- Forced trigger: data taking initiated by software every 0.1 s
- Summer 2023
- 24 antennas

## Results



- Able to provide a **preliminary calibration for individual antennas**
- Qualitative agreement between data and simulation
- Currently only statistical uncertainty

