

# Master thesis at Climate and Environmental Physics

## Topic: Reconstructing past atmospheric CO<sub>2</sub> levels with Antarctic ice cores

Antarctic ice cores are a window to study the Earth's climate for the past 800,000 years<sup>1</sup>. In specific, bubbles trapped throughout 3km deep ice cores are direct air archives that allow us to reconstruct past CO<sub>2</sub> atmospheric concentrations.

The Centrifugal Ice Microtome (CIM) is a dry-extraction system that crushes ice samples and measures the CO<sub>2</sub> content through laser absorption spectroscopy<sup>2</sup>. Developed here at KUP, the CIM relies on magnetic levitation technology to achieve state-of-the-art precision and sample throughput.



## Project tasks:

1. Further improvements on the CIM
  - New standard gas injection system
  - Optimisation in LabVIEW of the measurement routine
  - Development of routine for gas collection in sample fingers
2. Measurements of antarctic ice
  - Participation in running projects with ice from Dome Concordia

## References

- Lüthi, D., and Coauthors, 2008: High-resolution carbon dioxide concentration record 650,000-800,000 years before present. *Nature*, 453, 379-382, 2008
- Bereiter, B., T. F. Stocker, H. Fischer, 2013: A centrifugal ice microtome for measurements of atmospheric CO<sub>2</sub> on air trapped in polar ice cores. *Atmospheric Measurement Techniques*, 6, 251-262, 2013

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