Bachelor/Master in
Atom Trap Trace Analysis
How old is your water?

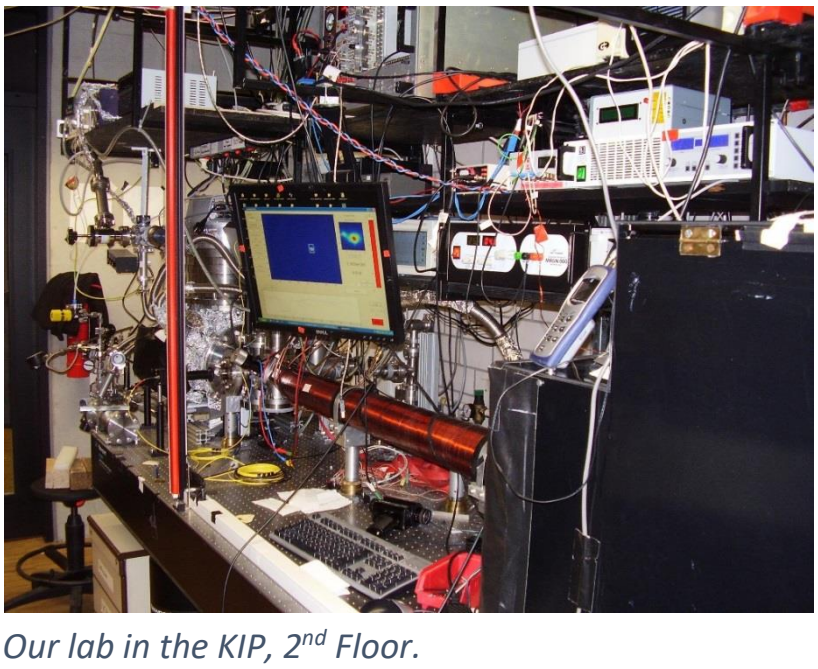
KIRCHHOFF-INSTITUT FÜR PHYSIK

ATTA in Heidelberg

What can be more interesting than using something so small scale as quantum technology to better understand a large scale like our environment?

The Heidelberg ATTA apparatus applies quantum optical methods to establish an ultra-sensitive detection method for the noble gas radioisotope ^{39}Ar. With its half-life of 269 years, it serves as a unique tracer for dating environmental samples such as ground-water, ocean water, stratified lakes, ice cores or even permafrost.

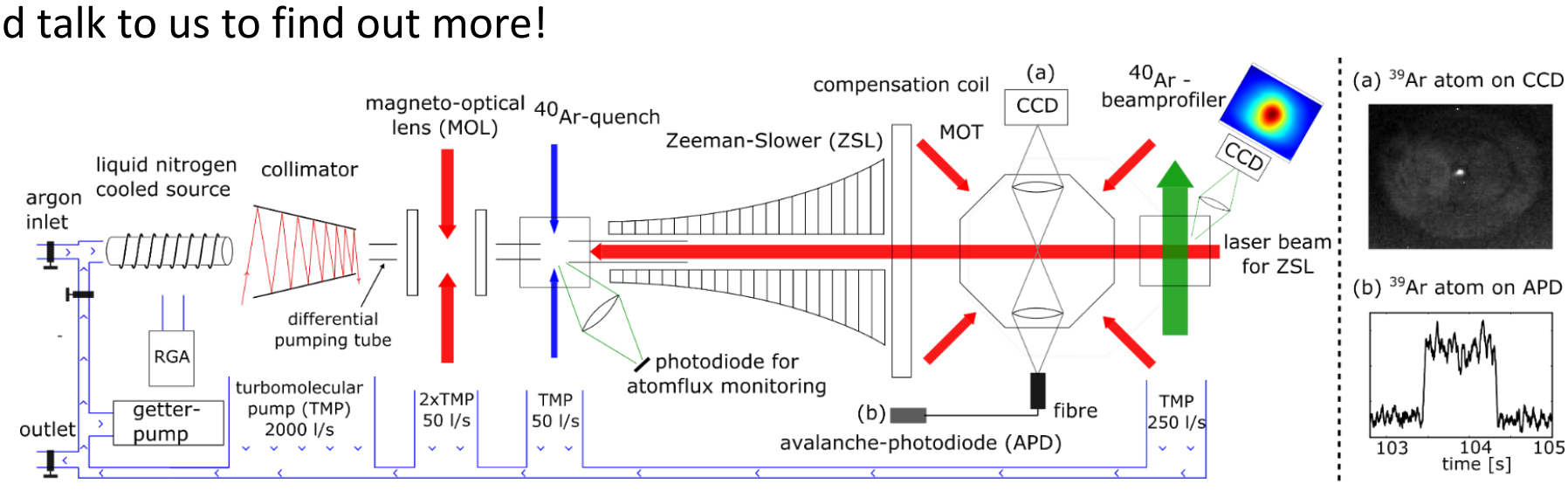
The challenge is the extremely low relative abundance (1:10^{15}) of ^{39}Ar to argon. We distinguish this rare isotope from the background of abundant argon by using the isotope shift in optical resonance frequency. The high selectivity is achieved by a multitude of scattering processes, which are realized in a magneto-optical trap where single atoms are captured and detected.



Our lab in the KIP, 2nd Floor.

Your Project

Depending on whether you are going to do your Bachelor or Master thesis we have different interesting projects. Everything from technical updates of the experiment to the measurement and interpretation of environmental samples is possible. Just come and talk to us to find out more!



Schematic setup of the ATTA apparatus. The image of a trapped ^{39}Ar atom is shown in (a) and the corresponding time-dependent signal of the avalanche-photodiode in (b).

Contact

Markus Oberthaler	markus.oberthaler@kip.uni-heidelberg.de	Room 02.102
Julian Robertz	julian.robertz@kip.uni-heidelberg.de	Room 02.317
David Wachs	david.wachs@iup.uni-heidelberg.de	Room 02.317
Yannis Arck	yannis.arck@iup.uni-heidelberg.de	Room 02.317