

## Bachelor or Master thesis at the Institute for Astroparticle physics (IAP)



### Revision of the Post-Acceleration Electrode (PAE): Commissioning, Penning Trap Simulation and effects of TRISTAN sensitivity

**Description and task of the work:** A new type of PAE is currently being developed and manufactured for various scenarios in order to eliminate the HV discharges inside the XHV detector tube of the KATRIN experiment. This is because the upcoming TRISTAN measurements (2026) for the search for sterile neutrinos with tritium will require a higher electrical potential than 10 kV, which is currently limited by electrical discharges of the built-in PAE.

**Bachelor:** This thesis concludes the actual design study with measurements and implementation of the PAE geometry in Kassiopeia to perform tracking simulations and Penning trap studies of the new design approaches.

**Master:** In addition, a special sensitivity study for the TRISTAN measurement campaign with the search for sterile neutrinos will be carried out with the TR model, as well as more detailed embedding of the PAE in the measurement setup of the detector replicas.

#### The basic topics of the work are:

- Data collection and verification of HV strength
- EM field simulations of the new design
- Sensitivity studies with Python

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**Start:** as of now

**The work is carried out at the IAP on the north campus.**

