

## **Master thesis in Experimental Nuclear Physics**

### **Charged particle trapping and manipulation at the PUMA test trap**

A Master thesis project is proposed at the Institute of Nuclear Physics (IKP) of TU Darmstadt.

#### **Project description:**

PUMA is a CERN experiment aiming at using trapped antiprotons to probe the low-density tail of stable and radioactive nuclei. A key aspect of PUMA is the trapping of a large amount of antiprotons for time scales of several weeks at the CERN/ELENA facility. To guarantee the long storage times for the trapped antiprotons, dedicated trapping techniques need to be applied. These trapping techniques and particle-in-cell simulations have to be benchmarked with the PUMA test trap at TU Darmstadt.

The Master project focuses on the trapping of electrons and measurements at the PUMA test trap in our laboratory. The laboratory is located in Pfungstadt. The thesis work comprises tests of different trapping techniques which allow to adjust the shape of the trapped electron cloud and to transport a fraction of the stored electrons to a different region within the trap. These tests are an important step for the full project, as they are essential for the successful antiproton trapping at CERN.

Besides the work at the PUMA test setup at TUDa, it is also foreseen that the candidate participates at beam times at CERN/ELENA, which will be used to benchmark the antiproton beamline in front of the trap system.

#### **Candidate profile:**

Only candidates holding a Bachelor degree in physics may apply.

Interested candidates should contact Dr. Frank Wienholtz, [fwienholtz@ikp.tu-darmstadt.de](mailto:fwienholtz@ikp.tu-darmstadt.de), or Prof. Alexandre Obertelli, [aobertelli@ikp.tu-darmstadt.de](mailto:aobertelli@ikp.tu-darmstadt.de).

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