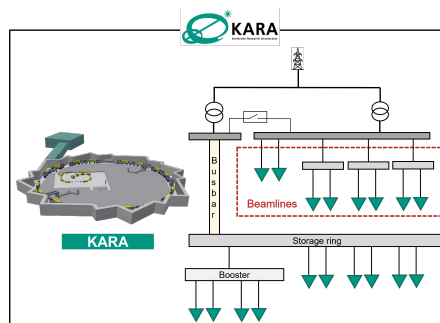


## Student Assistants (HiWi Job) at Energy Lab

### Analyzing Energy Consumption and Lifetime Energy Costs for Karlsruhe Research Accelerator (KARA)

#### Job Description:

Particle accelerators consist of complex, energy-intensive components with different power demands and operating schedules. The rising energy costs and environmental challenges highlight the need for sustainable and cost-effective operation of accelerator facilities. This necessitates optimization of the accelerator operation, which then requires a detailed analysis of KARA using one year of power consumption data.



#### Your Task:

- **High-Level Analysis:** It identifies the overall power consumption profiles of the main systems of KARA, such as the storage ring, cooling plants, and beamlines. It also explores how factors like temperature, humidity, operation mode, season, and electricity prices affect energy costs.
- **Lower-Level Analysis:** Conducts a similar analysis but breaks down each main system of the KARA accelerator to the component level.
- **lifetime energy cost analysis:** After analyzing energy cost sources for a year, considers component degradation, and future electricity price trends to assess the impact of these factors on energy consumption over time.

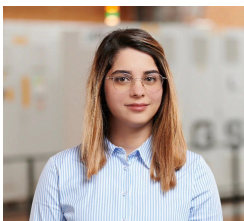
#### Your Profile:

- Strong analytical and Statistical skills with MATLAB or **Python** for data analysis.
- Basic knowledge of particle accelerators (preferred but not mandatory).
- Language: English

#### You will learn:

- Advanced data analysis techniques for energy systems, including statistical modeling and scenario simulations.
- Lifetime cost analysis for complex systems
- Particle accelerator operations

#### Contact:



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**Workload:** 20-40h per month

**Start:** from now on

