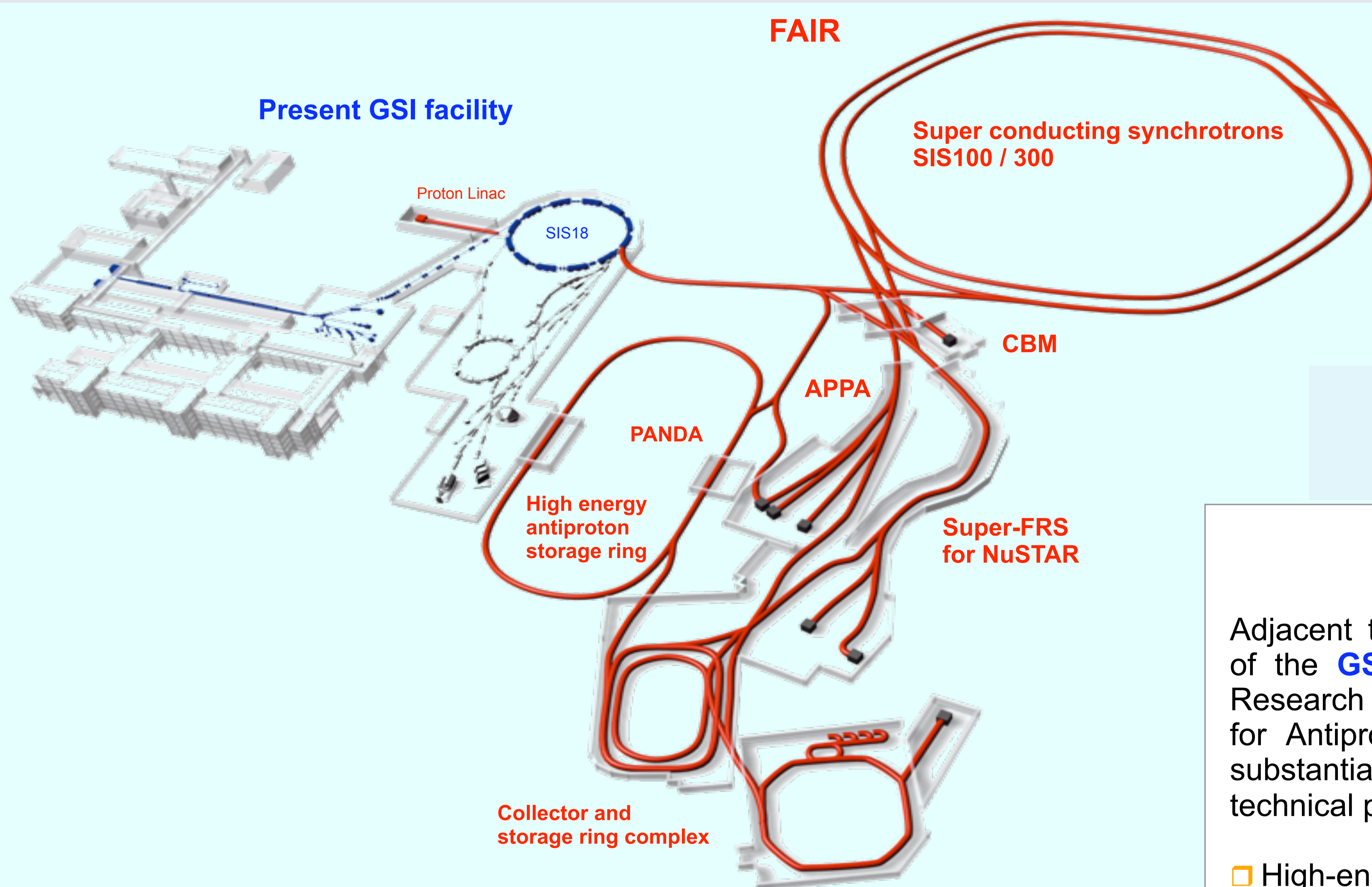


Facility for Antiproton and Ion Research



The Universe in the Laboratory



The Facility

Adjacent to the existing accelerator complex of the **GSI** Helmholtz Centre for Heavy-Ion Research in Darmstadt / Germany, the Facility for Antiproton and Ion Research **FAIR** will substantially expand research goals and technical possibilities.

- High-energy and high-intensity beams of
 - Rare isotopes
 - Cooled antiprotons
 - Heavy ions
- First beams expected in 2016
- 3,000 scientists from 45 countries
- 16 member countries
- 1.2 billion € construction costs
- 18 hectare site area

Research Programme

The research programme of **FAIR** includes 14 initial experiments, which form the four scientific pillars of FAIR:

APPA - Atomic Physics, Plasma Physics and Applied Sciences
High-energy atomic physics, plasma physics, material research, and bio (medical) science

The Compressed Baryonic Matter Experiment CBM
Experiments on dense, strongly interacting matter in high-energy and high-intensity nucleus-nucleus- collisions

NuSTAR - Nuclear Structure, Astrophysics and Reactions
Nuclear structure and reactions, nuclear astrophysics using high-intensity radioactive ion beams

The PANDA Experiment: Antiproton Annihilation in Darmstadt
Hadron structure and spectroscopy using cooled precision beams of antiprotons

Fundamental Questions The FAIR Science Case

How does the complex structure of matter at all levels arise from the basic building blocks and the fundamental interactions?

How can the structure of hadronic matter be deduced from the strong interaction? In particular, what is the origin of the hadron masses?

What is the structure of matter under the extreme conditions of temperature and density found in astrophysical objects?

What was the evolution and the composition of matter in the early Universe?

What is the origin of the elements in the Universe?

Member Countries of FAIR

Observers

