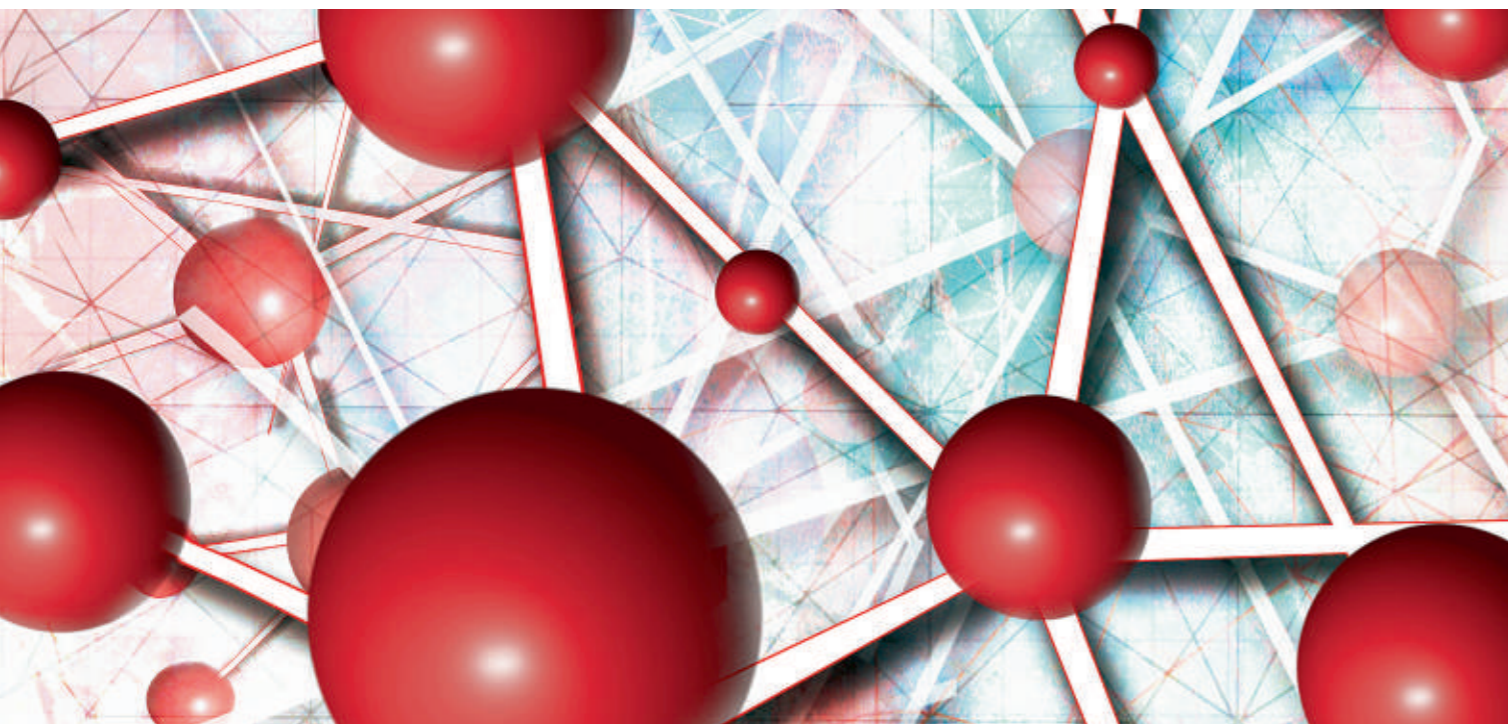


Performance polymers in the service of physics

Thomas Blum, Product Application Engineer

The acronym FAIR stands for one of the world's biggest research projects in the field of basic physics. The GSI Helmholtz Center for Heavy Ion Research has conceived a particle accelerator capable of generating antiproton and ion beams of unparalleled intensity and quality. In such a highly complex accelerator facility, every detail has to be perfect: plastic holders from Angst+Pfister help the photodiodes to deliver ultra-precise measurement results and ensure that they never get rattled.



The FAIR project aims to build a next-generation particle accelerator facility.



Prototypes of the plastic holders from Angst+Pfister (front and back views)

FAIR is an abbreviation for Facility for Antiproton and Ion Research. The accelerator facility uses electrical and magnetic fields to bundle charged particles such as ions and protons into a beam and to accelerate them to high speeds. The centerpiece of the facility is a double-ring accelerator 1,100 meters in circumference attached to a complex system of cooler-storage rings and experiment stations. During the construction of the pre-accelerator complex, which consists of a total of eight circular accelerators and two linear accelerators, the Angst+Pfister Group's know-how in the area of engineering

plastics technology was called upon. In a unique cooperative project between Angst+Pfister, the **PANDA** (= Anti-Proton **AN**ihilations at **D**armstadt) research group and other partners since March 2007, exclusive holders have been designed for photodiode capsules that play a key role in reading and measuring reaction products.

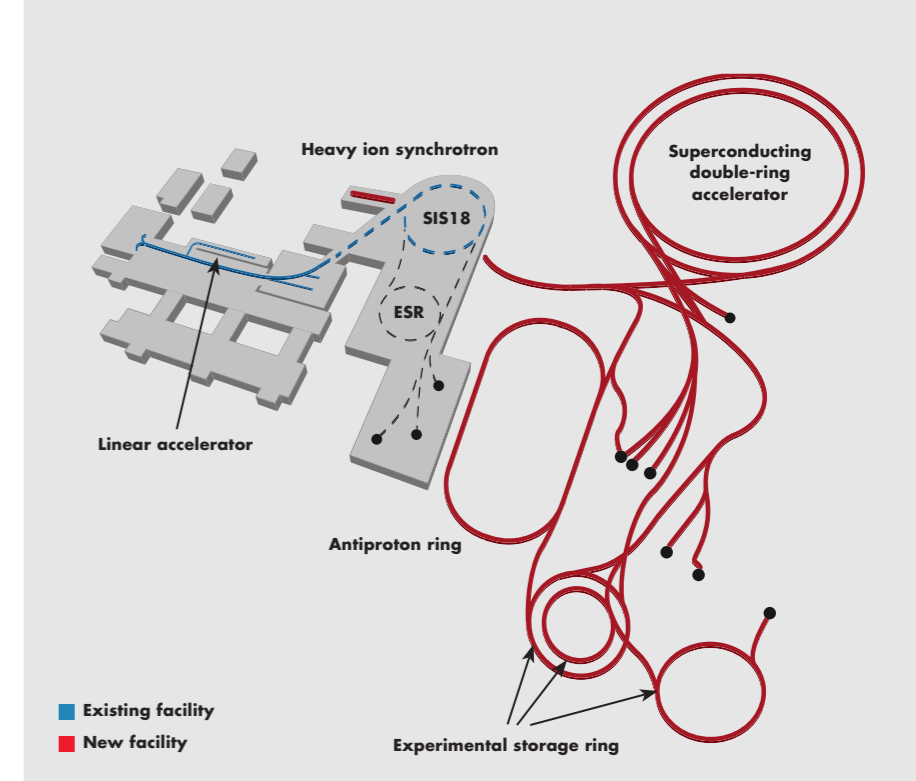
From the Big Bang to the present

Ions are atoms that have acquired a net electric charge by gaining or losing one or more electrons. The mission of

the GSI Helmholtz Center for Heavy Ion Research in Darmstadt, Germany, lies in building and operating particle accelerators. The FAIR project aims to yield new insights into the structure of matter and how the universe evolved from the Big Bang to the present. The accelerator facility should enable researchers to conduct an unprecedented variety of experiments. GSI's existing particle accelerators will serve as pre-accelerators for the new FAIR project facility. Angst+Pfister contributes to the functioning of the modern facility by supplying specially developed finished components made from a special high-performance plastic.

Demanding specifications profile

The project participants gradually closed in on the final configuration of the photodiode holder, starting by selecting the material, then continually adjusting the prototype design and then moving to pilot batch production. This was not an easy assignment, but the task was skillfully accomplished thanks to the experience and expertise of Angst+Pfister and the project group headed by Dr. Andrea Wilms. The specifications profile for the component was very extensive. The holders must stay dimensionally stable within a temperature range of -25°C to +28°C. In addition to UV resistance, excellent resistance to doses



Sketch of the projected circular accelerator

of radiation is vital. High dielectric resistance should inhibit all conductivity, and thermal conductivity should also be as low as possible. APSoplast® PEEK is a high-performance plastic from Angst+Pfister that fully meets all of those specifications and can survive long service lifetimes without sustaining any damage.

APSoplast® PEEK – excellent quality and cost savings

APSoplast® PEEK stands out for properties such as high stiffness and fatigue strength. The use of the modified special compound containing titanium dioxide (TiO₂) improves the excellent property profile by additionally enhancing the reflectivity of the surfaces and the UV resistance. By the way, the photodiode holders fabricated by Angst+Pfister also meet the requirement calling for high planarity. Angst+Pfister injection-molds the parts in series production. This process ensures very tight tolerances at points critical to proper functioning. Aside from the cost advantages of large-series production, the parts fabricated in a single batch are all virtually identical.

Solutions from under one roof – the decisive advantage

Angst+Pfister has made it its mission to not just supply products that are optimally tailored to the specific purpose at hand, but to also support its customers with intensive onsite service. This continual customer care is currently benefiting the PANDA project, enabling it to

obtain measurement results with maximum precision. The collaboration with the GSI Helmholtz Center for Heavy Ion Research is just one example of the growing demand on the part of institutions and research organizations for products and services from Angst+Pfister. Alongside the flexible execution of customers' wishes, the development of the photodiode holders highlights a decisive advantage: the focused synthesis of materials, application and supplier expertise, all from under one roof.

Your contact:
 Thomas Blum
 Angst+Pfister GmbH, 70565 Stuttgart, Germany
 Telephone: +49 (0) 162 26 32 754
 E-mail: thomas.blum@angst-pfister.com

APSoplast® PEEK is a registered trademark of Angst+Pfister.