

ION BEAM CENTRE



**Forschungszentrum
Dresden Rossendorf**

Ions for Europe The Ion Beam Centre

The Ion Beam Centre of the Forschungszentrum Dresden-Rossendorf is devoted to the application of ion beams to modify and analyze near-surface layers of materials. The center is an open facility of the Institute of Ion Beam Physics and Materials Research operating

- three MV electrostatic accelerators
- three ion implanters
- fine-focused ion-beam devices
- highly-charged ion devices
- devices for plasma immersion ion implantation
- devices for ion-assisted deposition of thin films

In 2010, the 5 MV van de Graaf tandem accelerator will be replaced by a 6 MV Tandetron machine, which will also enable the application of accelerator mass spectrometry.

This broad spectrum of equipment delivers fast ions at energies ranging from several eV to several ten MeV. Basic research to explore new possibilities for surface modification of materials by ion irradiation is combined with the development of technological applications in cooperation with industry. The related fields of research and development include

- microelectronics
- optoelectronics
- semiconductor research and technology
- nanotechnology
- magnetism
- photovoltaics
- tribology and biocompatibility

The ion devices are complemented by a broad range of materials and surface diagnostics being available at the Institute, such as transmission and scanning electron microscopy, X-ray diffraction and reflection, scanning tunnelling, atomic force, magnetic and Kelvin probe microscopy, Auger electron and X-ray photoelectron spectroscopy, Raman spectroscopy, spectroscopic ellipsometry, and mechanical testing. A clean room is available for sample preparation, lithography, thin film deposition and post-implantation annealing processes.





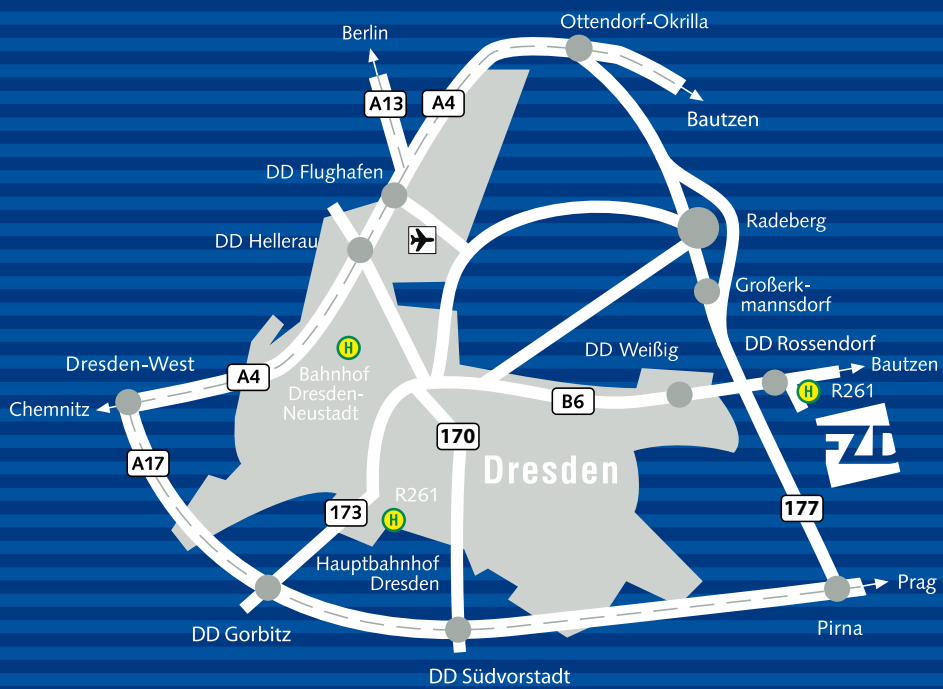
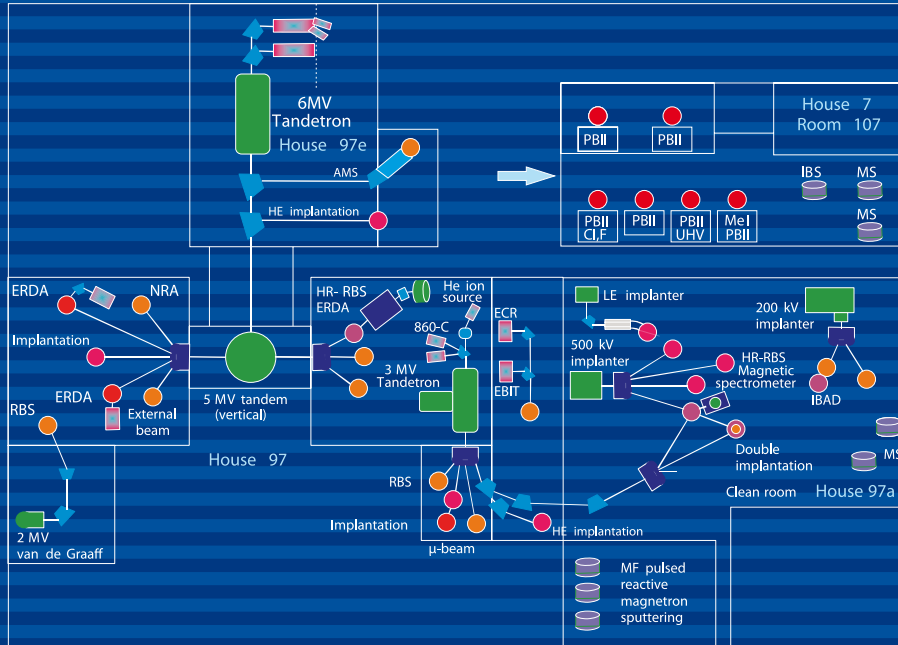
More than 50% of user time of the center is made available to external users from universities, other research institutions, and industries. Averaged over a period of three years, more than 150 user groups benefited from the FZD ion facilities during the past years, with a share of roughly 40%, 45%, and 15% from Germany, the European Union, and other countries, respectively.

Since 1998, the Ion Beam Centre has been funded by the European Commission as a European Infrastructure for Transnational Access "AIM – Application of Ion Beams to Materials Research". As a follow-up, FZD coordinates a **European Integrated Infrastructure Initiative "SPIRIT – Support of Public and Industrial Research Using Ion Beam Technology"** from 2009 to 2013, which involves eleven top European ion beam centers for materials research as well as biomedical and environmental applications.

The center has continuously expanded its industrial cooperation projects and services. Industry plays an important role through partnerships in cooperative projects utilizing in-house research. From 2005 to 2008, there were direct cooperation projects and industrial services with about 60 groups from German industry and 15 groups from foreign countries. Presently, direct industrial activities account for about 15% of the total capacity of the center. Direct industrial cooperation covers a wide range of industrial research dealing with the development of materials and components and the characterization of products.

In 2010 the Ion Beam Centre will expand its measurement capability by another highly-sensitive analytical method, accelerator mass spectrometry (AMS), which will be used for the determination of long-lived radionuclides. AMS generally provides much lower detection limits in comparison to conventional mass spectrometry or counting techniques. Our AMS system will offer excellent measurement capabilities for external users from environmental and geosciences, radiation protection, nuclear safety and waste, radioecology, phytology, nutrition, toxicology, and pharmacology.

Applications can be turned in all the year round and will be evaluated continuously.



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