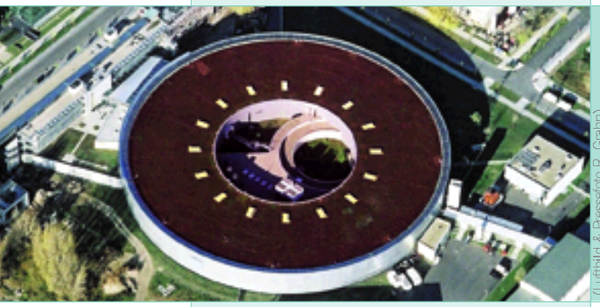


(Luftbild & Pressefoto R. Grahn)

BESSY in Berlin-Adlershof

BESSY storage ring facility

Office and laboratory building

The Berliner Elektronenspeicher-ring-Gesellschaft für Synchrotron-strahlung m.b.H. - BESSY (Berlin electron storage ring company for synchrotron radiation) is a service oriented institution for scientific research and technolo-gical developments.

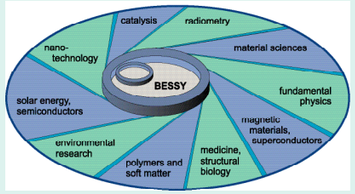
BESSY was founded in 1979. From 1982 to 1999 BESSY operated the electron storage ring facility BESSY I in Berlin-Wilmersdorf. Since 1998 the new high brilliance synchrotron radiation source BESSY II in Berlin-Adlershof is in operation. As one of the most modern syn-chrotron radiation sources worldwide it offers extended research opportunities for its users.

BESSY provides highly brilliant synchrotron radiation from the infrared to the hard X-ray spectral region for applications in physics, chemistry, medicine, material sciences, analytics, nanotech-nology, and life sciences.

Parameters of BESSY

electron energy (GeV)	1,7
circumference of the storage ring (m)	240
emittance (horizontal) (rad m)	$6 \cdot 10^{-9}$
straight sections	16
beamlines with	
- dipoles	max. 40
- insertion devices	max. 30
brilliance $\frac{\text{photons}}{\text{sec mm}^2 \text{ mrad}^2 \text{ 0,1\% BW*}}$	ca. 10^{19}

*BW: spectral bandwidth



Synchrotron radiation is applied in many fields of science

Company owners:

- Deutsches Elektronensynchrotron Hamburg (DESY)
- Forschungszentrum Karlsruhe GmbH Technik und Umwelt (FZK)
- Forschungszentrum Jülich GmbH (FZJ)
- Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.
- Hahn-Meitner-Institut Berlin GmbH
- Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V.

User groups:

more than 200 user groups from

- universities,
- the Max-Planck-Gesellschaft,
- the Helmholtz-Gemeinschaft,
- the Leibniz-Wissenschafts-gemeinschaft

and similar research institutions from the European Union.

Structure:

- accelerator division
- experimental division
- central services
- administration
- 188 employees (January 2002)
- annual budget: 22 million Euro (2002)
- directors: Prof. Dr. Wolfgang Eberhardt, Prof. Dr. Eberhard Jaeschke

Published by Berliner Elektronenspeicherring-Gesellschaft für Synchrotronstrahlung m.b.H. BESSY | Member of the Leibniz-Wissenschaftsgemeinschaft | Albert-Einstein-Straße 15 | 12489 Berlin | Germany | phone: +49 (0) 30–63 92 29 99 | fax: +49 (0) 30 – 63 92 29 90 | www.bessy.de | e-Mail: info@bessy.de | January 2002

BESSY

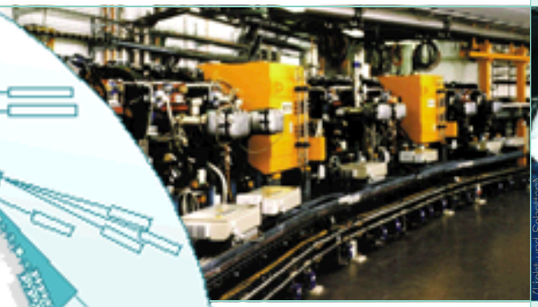
Berliner Elektronenspeicherring-Gesellschaft für Synchrotronstrahlung m.b.H.

Production of synchrotron radiation at BESSY

Synchrotron radiation is also visible

Microgear manufactured by using synchrotron radiation

Maintenance of a beam line



Segment of the BESSY storage ring

BESSY user at a typical experiment

Undulator to enhance the radiation brilliance

Synchrotron radiation is practically unmatched by any other source in the wide spectral range from the vacuum ultra violet (VUV) light to hard X-rays.

Synchrotron radiation occurs when electrons traveling at nearly the speed of light are deflected by a magnet. As a result of the radial acceleration in the magnetic field the particles emit electromagnetic radiation.

Electrons, emitted by a hot cathode, are accelerated in the microtron and the synchrotron to the final energy of 1.7 GeV (1,700 million electron volts). They race through the vacuum chamber of the storage ring for several hours, kept on a stabile trajectory by strong electromagnets.

Synchrotron radiation produced by the bending magnets and undulators leaves the storage ring tangentially through the radiation outlets (front ends) into the beamlines. In the beamlines the radiation is dispersed by optical gratings, focussed and guided by mirrors to the experimental end stations.

View inside the experimental hall at BESSY: 60 to 70 experimental stations can be set up and operated.

"More light" (Goethe) is the wish of most users of synchrotron radiation. Higher brilliance reduces the time necessary for the experiments. It also makes higher resolution feasible and allows measurements of smallest amounts of substances and several different physical quantities at the same time. To produce more light periodic arrays of magnets, so-called wigglers and undulators, are inserted into the straight sections of the storage ring.

The outstanding properties (see table on the left) make synchrotron radiation a unique light source for a large variety of applications.

Synchrotron radiation is an important tool used to investigate structure and function of different kind of materials, e.g. magnetic materials, solar cells, superconductors or living cells. Spectroscopic techniques are used to explore the geometric and electronic structure of atoms and molecules which are closely related to the chemical and physical properties of matter.

The Physikalisch-Technische Bundesanstalt (PTB) utilizes the BESSY radiation in its own laboratory for radiometric investigations while in applied research efforts nanotechnology plays an important role.