

PAUL SCHERRER INSTITUT



WIR SCHAFFEN WISSEN – HEUTE FÜR MORGEN


Research at the
Paul Scherrer Institute

The Institute

The Paul Scherrer Institute PSI is a research institute for natural and engineering sciences, conducting cutting-edge research in the fields of matter and materials, energy and the environment and human health. By performing fundamental and applied research, we work on sustainable solutions for major challenges facing society, science and economy. PSI develops, constructs and operates complex large research facilities. Every year more than 2500 guest scientists from Switzerland and around the world come to us. Just like PSI's own researchers, they use our unique facilities to carry out experiments that are not possible anywhere else. PSI is committed to the training of future generations. Therefore about one quarter of our staff are post-docs, post-graduates or apprentices. Altogether PSI employs 2100 people, thus being the largest research institute in Switzerland.

PSI – a place of dialogue

PSI would like to bring the world of research closer to the general public. Come to our Visitor Centre – the psi forum – and use the opportunity to view the large research facilities during a guided tour. Teachers can get a taste of research, along with their school classes, during a whole day in the school laboratory, iLab. We look forward to seeing you!



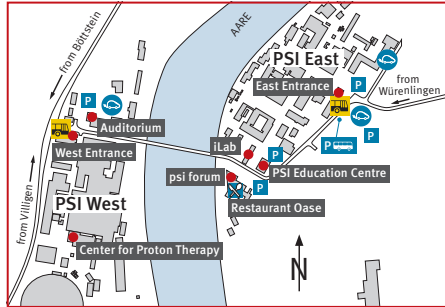
A bird's-eye view of Paul Scherrer Institute.

Getting to PSI

<http://www.psi.ch/how-to-find-us>

Bus: From Brugg railway station (Number 376 Brugg-Döttingen)

Car: Main roads from Brugg to Koblenz, or Baden to Koblenz



The Large Research Facilities

PSI operates a number of large research facilities, at which experiments can be carried out that are not possible in smaller laboratories. All of these facilities are unique in Switzerland, and some cannot be found anywhere else in the whole world but at PSI:

Swiss Light Source SLS

Using synchrotron light, scientists can “X-ray” the most diverse materials and thereby determine the detailed composition of very small structures, down to nanometre size.

SwissFEL X-ray free-electron laser

The ultrashort laser pulses of SwissFEL turn action on the smallest scale into movies: With them, researchers can observe ultrafast processes in progress.

Swiss Spallation Neutron source SINQ

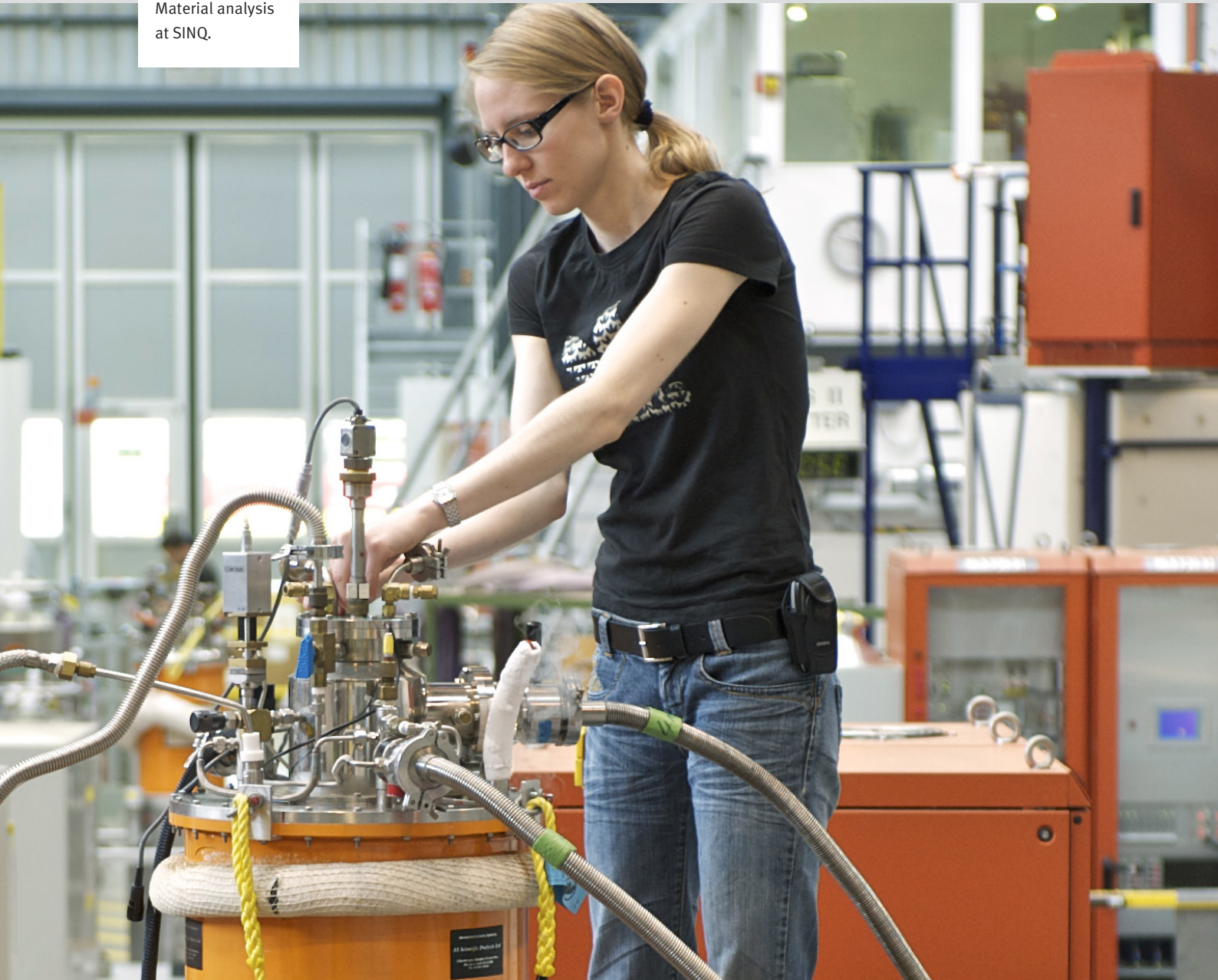
Using neutrons, new materials are examined, for example for superconductors or computer storage, and metals can be “shone through”, so that it is possible to see inside an engine or a bronze bust.

Swiss Muon Source SμS

Muons are used at PSI primarily to determine the magnetic fields inside materials. The slowest muons in the world can be found at PSI. These are highly demanded by scientists.



Material analysis
at SINQ.

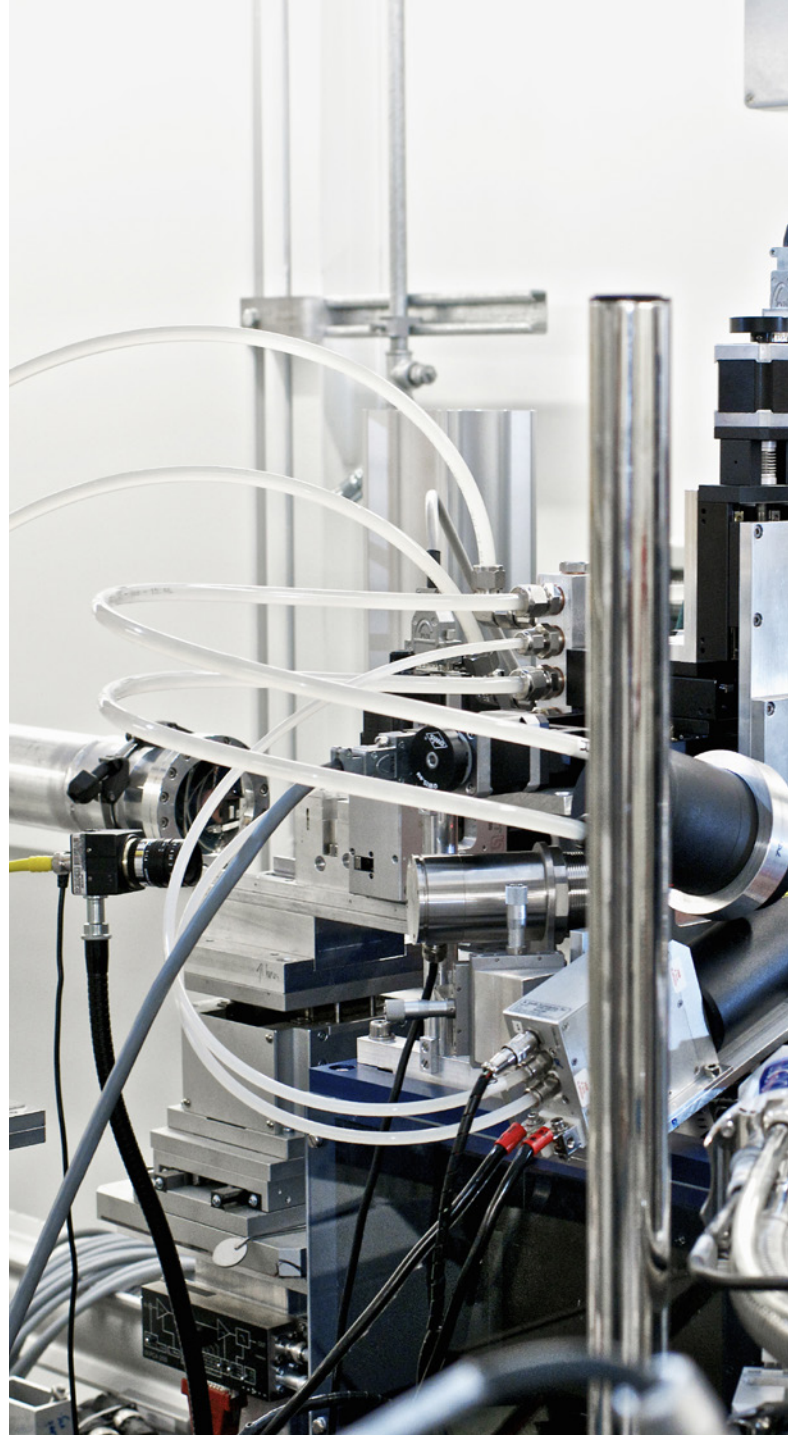


User Service

The construction and operation of a large research facility involve such a huge amount of time, effort and cost that most research groups cannot find such measurement facilities at their own institute. For this reason, the PSI facilities are available for external researchers to use.

All scientists who hope to find answers to their scientific questions through the use of neutrons, muons or synchrotron light can make an application for beam-time at PSI. A committee composed of experts from around the world appraises these applications for their scientific quality and advises PSI which ones should actually be granted beam-time.

Beam-time at PSI is free of charge for all academic researchers. Users from industry, however, can buy beam-time through a special procedure and use the PSI facilities for their own applied research.





A user experiment
at the SLS.

Matter and Materials






Research on magnetic materials
for data storage.

PSI materials researchers would like to understand, for different substances, the relationship between their internal construction and their observable properties, as the manifold properties of the materials of which the world is composed are determined by the atoms of which these materials are made, how they are arranged and how they can move.

PSI particle physicists are interested in fundamental questions concerning the basic structure of a material. For this reason, they study the composition and properties of elementary particles – the smallest building blocks of matter.

Human Health

Scientists at PSI want to understand the essential processes in living organisms at the molecular level, and develop new methods for the diagnosis and treatment of diseases. For this, they define the structure and function of proteins that, in diverse ways, govern the behaviour of living cells. In radiopharmacy, they are developing therapy molecules with which very small tumours, distributed throughout the body, can be treated. At the proton therapy facility at PSI, which is unique in the world, patients suffering of specific types of cancer can be treated in a particularly precise way without damaging healthy tissue.



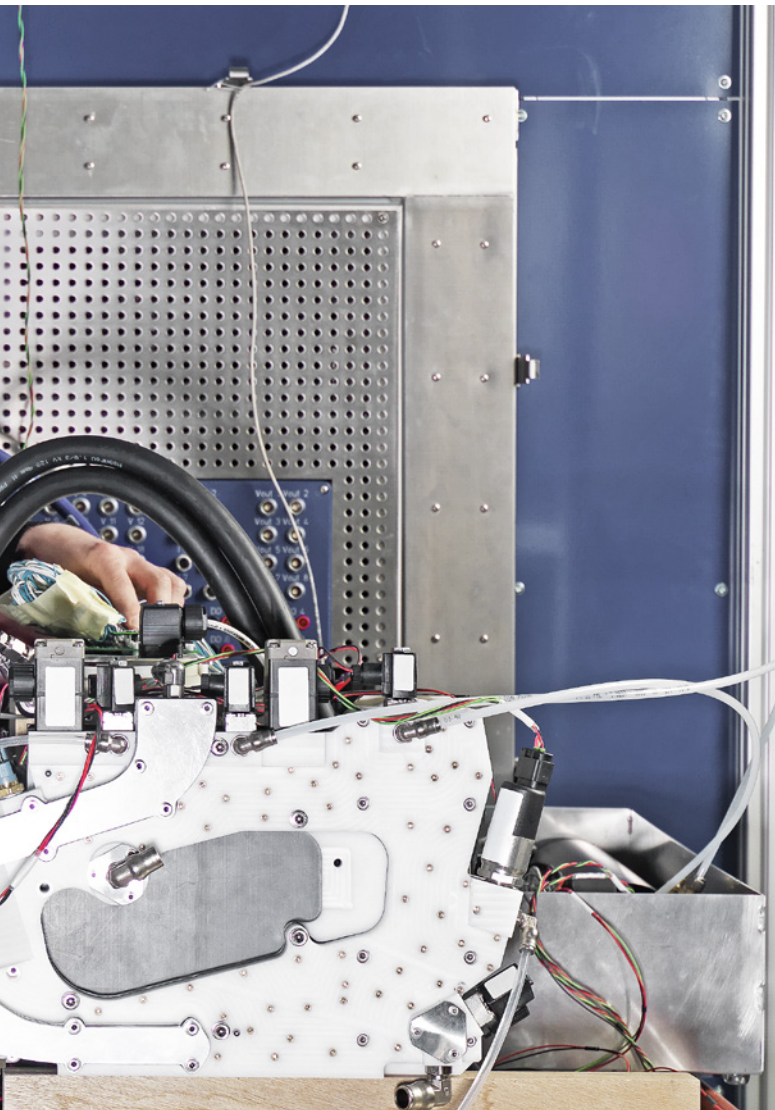
Development of a method preventing the pathological growth of blood vessels.



Energy and Environment

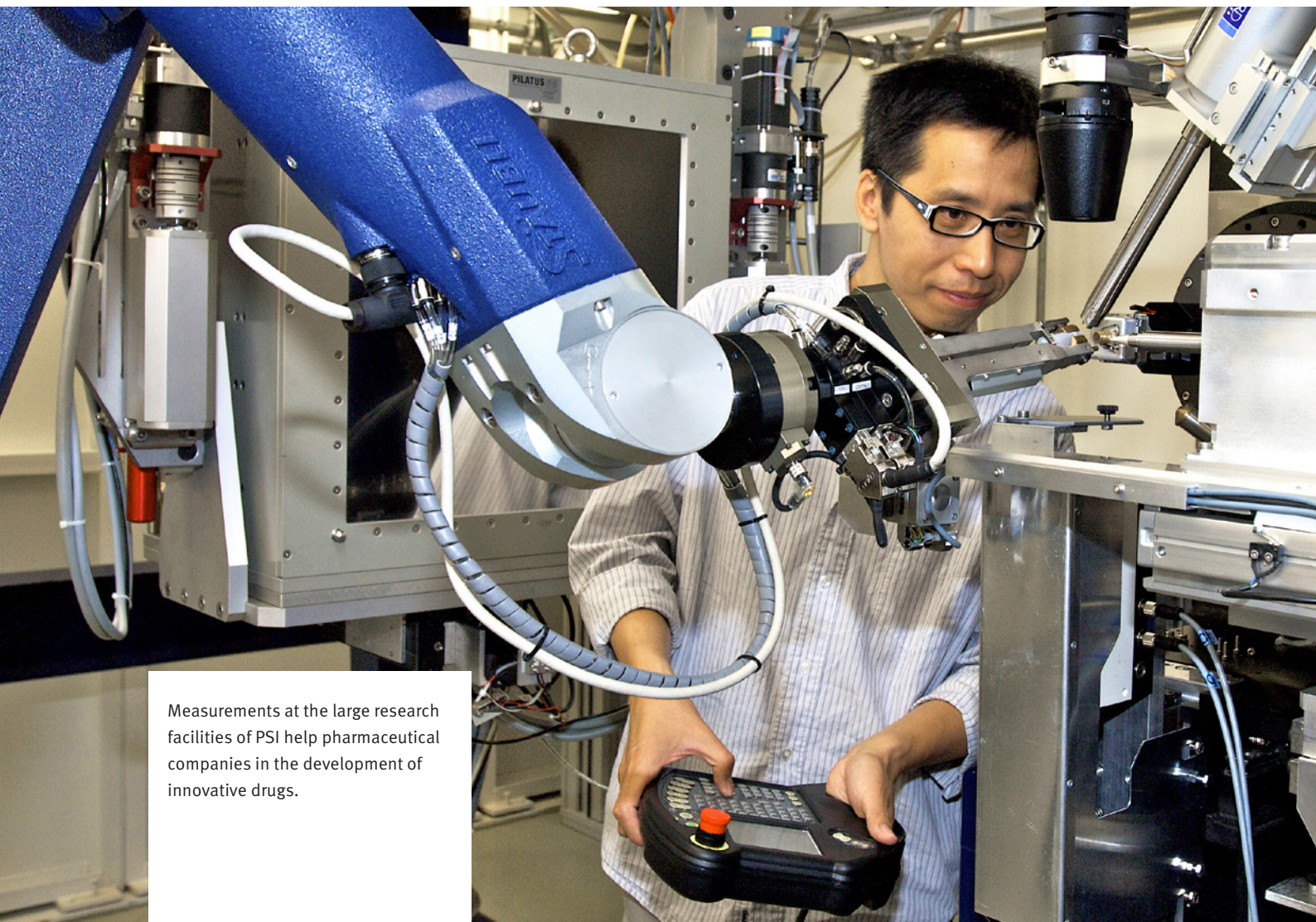


PSI is carrying out research on a system of low-cost fuel cells.



Energy research at PSI concentrates on topics that contribute to the environmentally friendly use of energy as well as the safe handling of energy technology. Included in this are energy storage and conversion, low-pollution combustion and renewable energy, as well as reactor safety and the safe deep geological repository of radioactive waste. Environmental researchers at PSI concentrate primarily on the composition of the atmosphere and the processes controlling this composition. To do this, they take measurements, for example, at the Jungfrauoch or investigate ice cores taken from glaciers.

From research to innovation



Measurements at the large research facilities of PSI help pharmaceutical companies in the development of innovative drugs.



PSI also makes new insights from research accessible to the economy. Thus research can be more rapidly translated into innovation, strengthening the international competitiveness of Swiss companies.

PSI offers a variety of research and development services. Also, companies can use the facilities of PSI for their own research and development work or conduct joint research projects with PSI. Not least, PSI supports the founding of so-called spin-off companies that are based on technologies or know-how from PSI research.

In the future, business and research will cooperate even more closely. An innovation park called “Park innovaare” is currently being developed in the immediate vicinity of PSI. There innovations are expected to be jointly created and brought to the point where they are ready for the market.

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