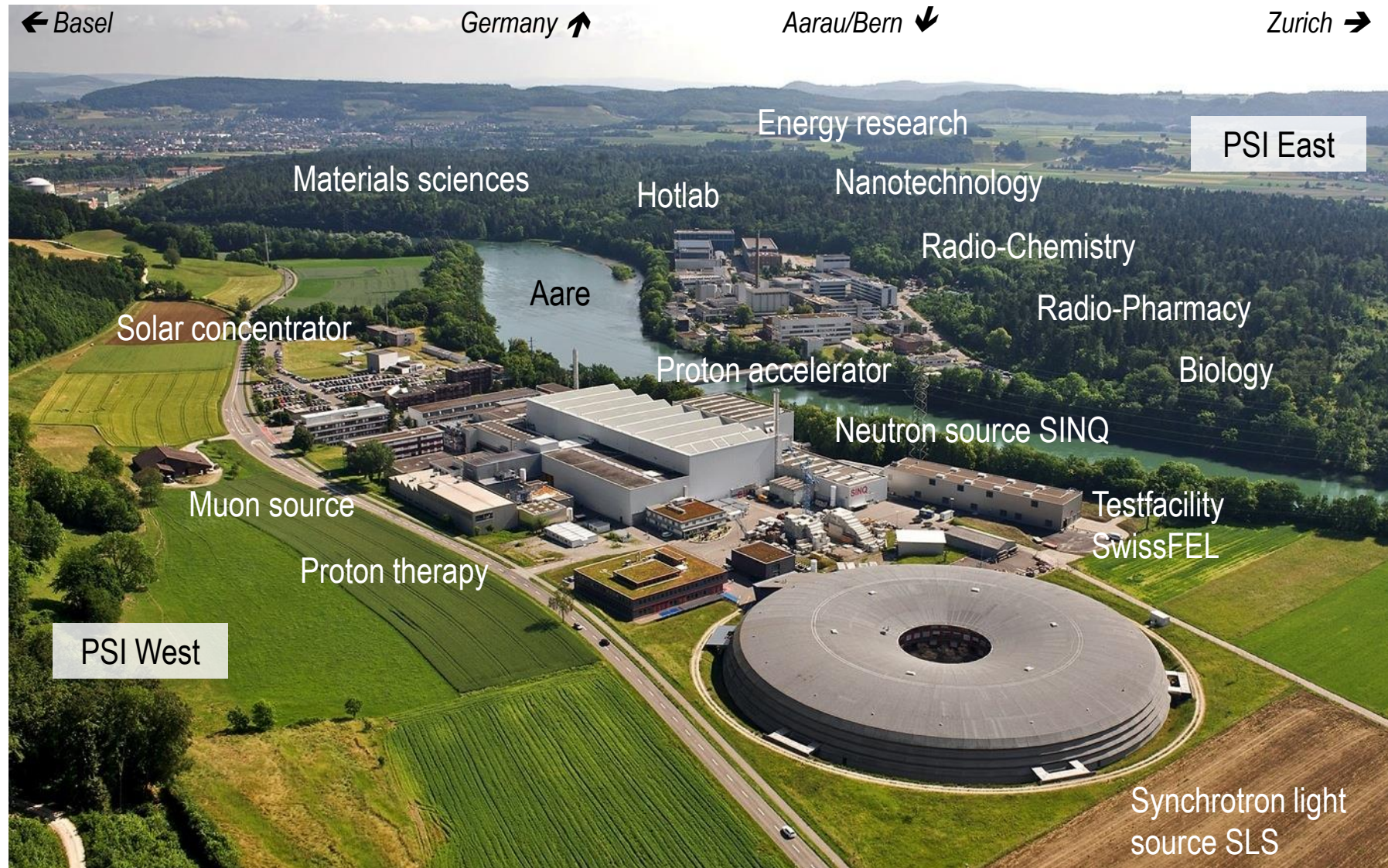




Wir schaffen Wissen – heute für morgen

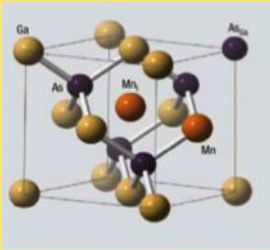
Welcome and introduction to Paul Scherrer Institut

Lenny Rivkin, Head of Large Research Facilities Department

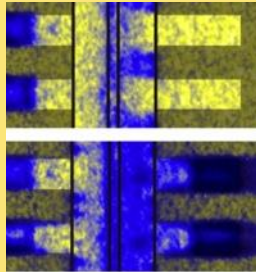




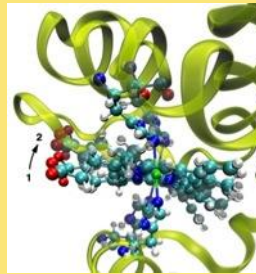
science of
matter and
materials



energy and
environment



life sciences



development
construction
operation



large scale
research facilities



national and international users
academia and industry

more than 2400 external users / year (44 beamlines)

knowledge &
expertise

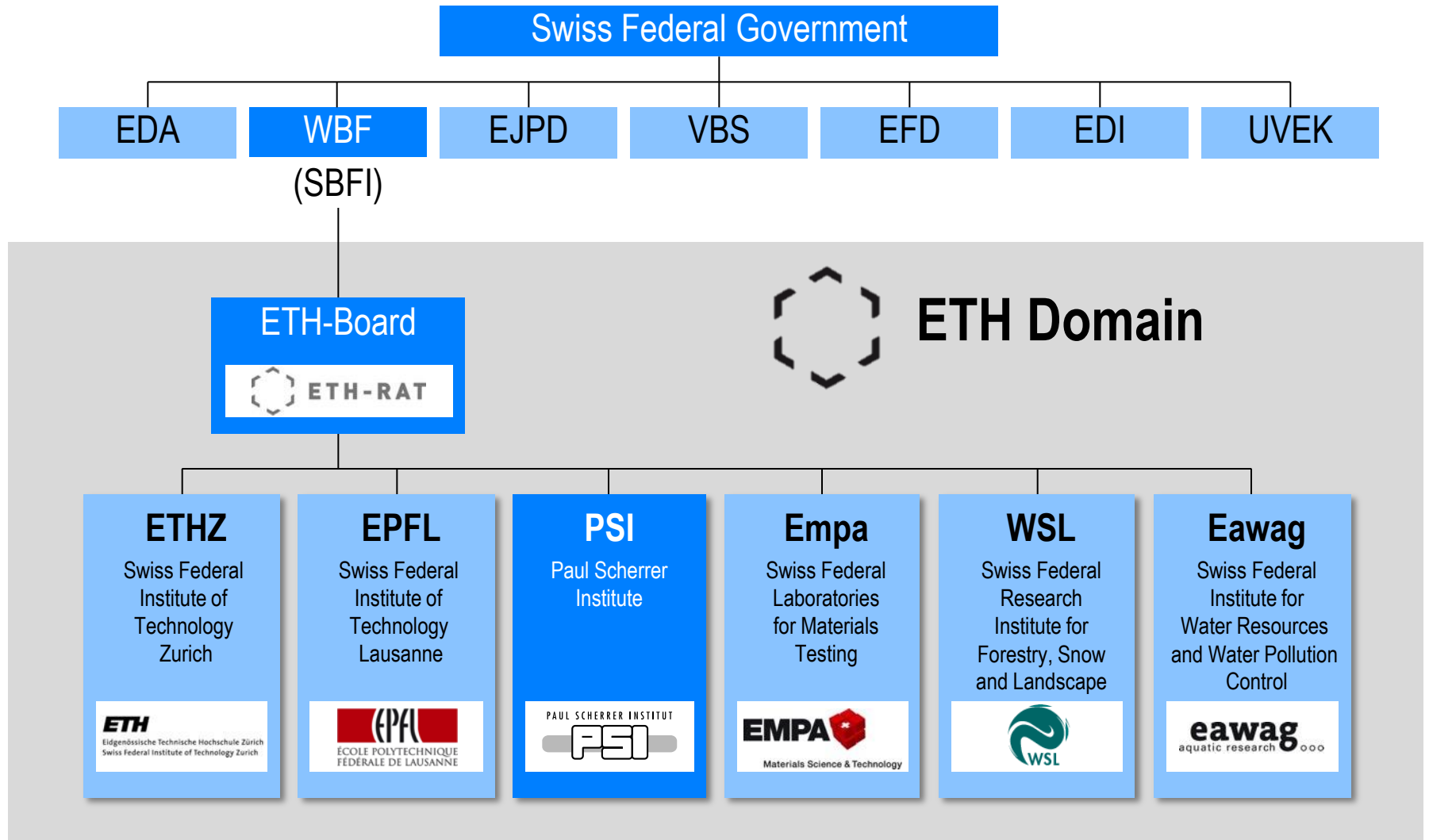


education

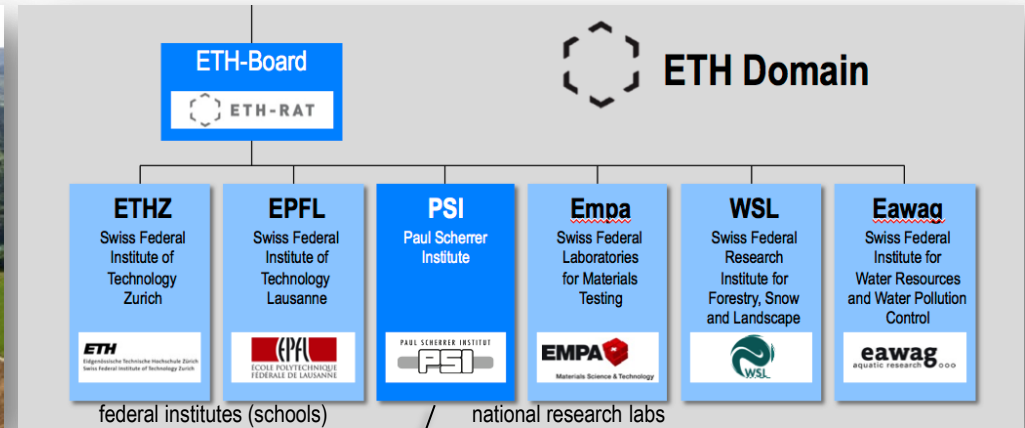


technology
transfer

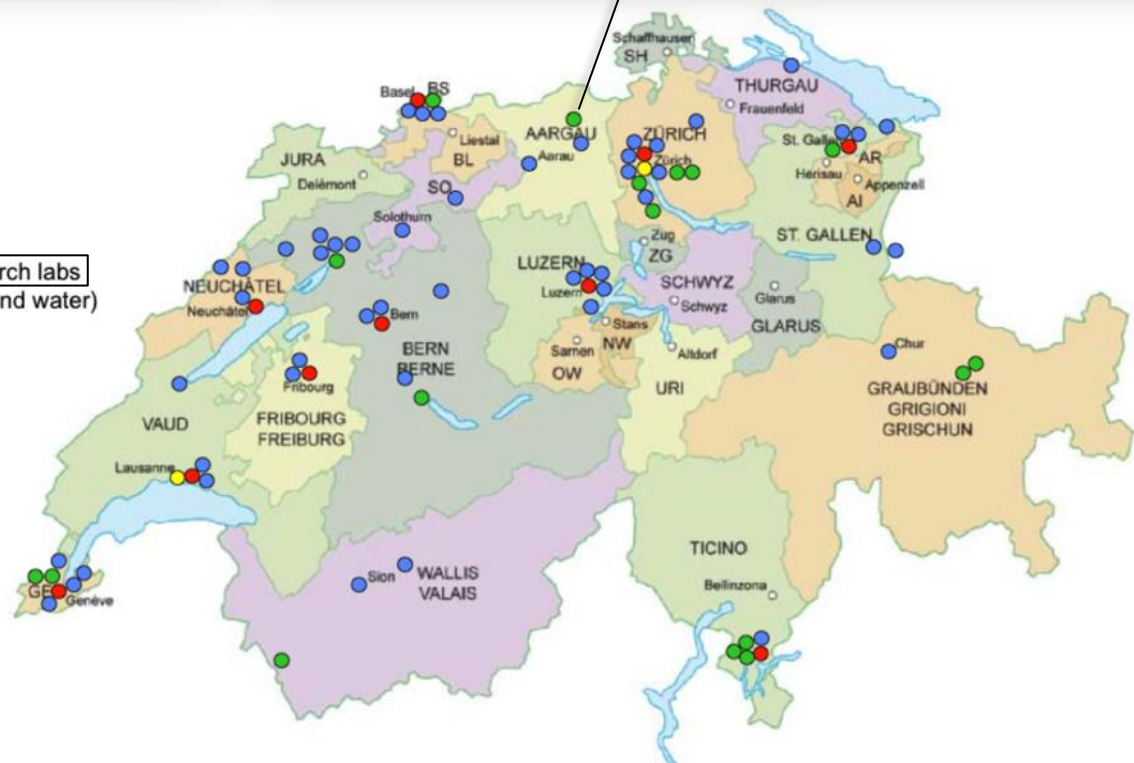




Synoptic view over Switzerland's university landscape

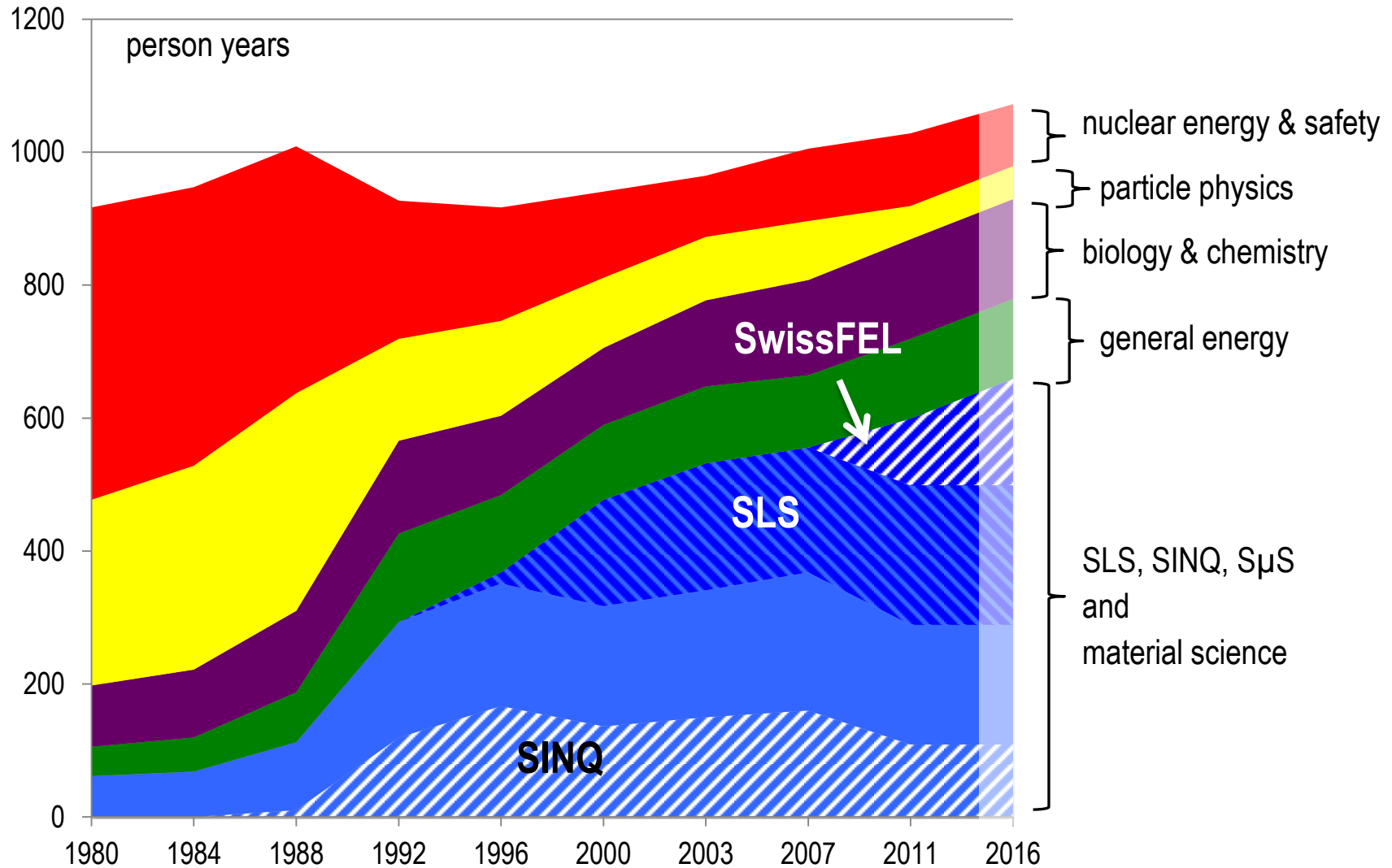


- **2 Federal Institutes of Technology**
(ETH Zurich and Lausanne)
- **17 Federal Research Institutes**
(among them the four national research labs for energy, materials, natural risks and water)
- **10 Cantonal Universities**
- **50 Universities of Applied Sciences (UAS, Fachhochschulen)**
organized in 8 regional clusters (seven are public, one is a Public-Private Partnership, PPP)

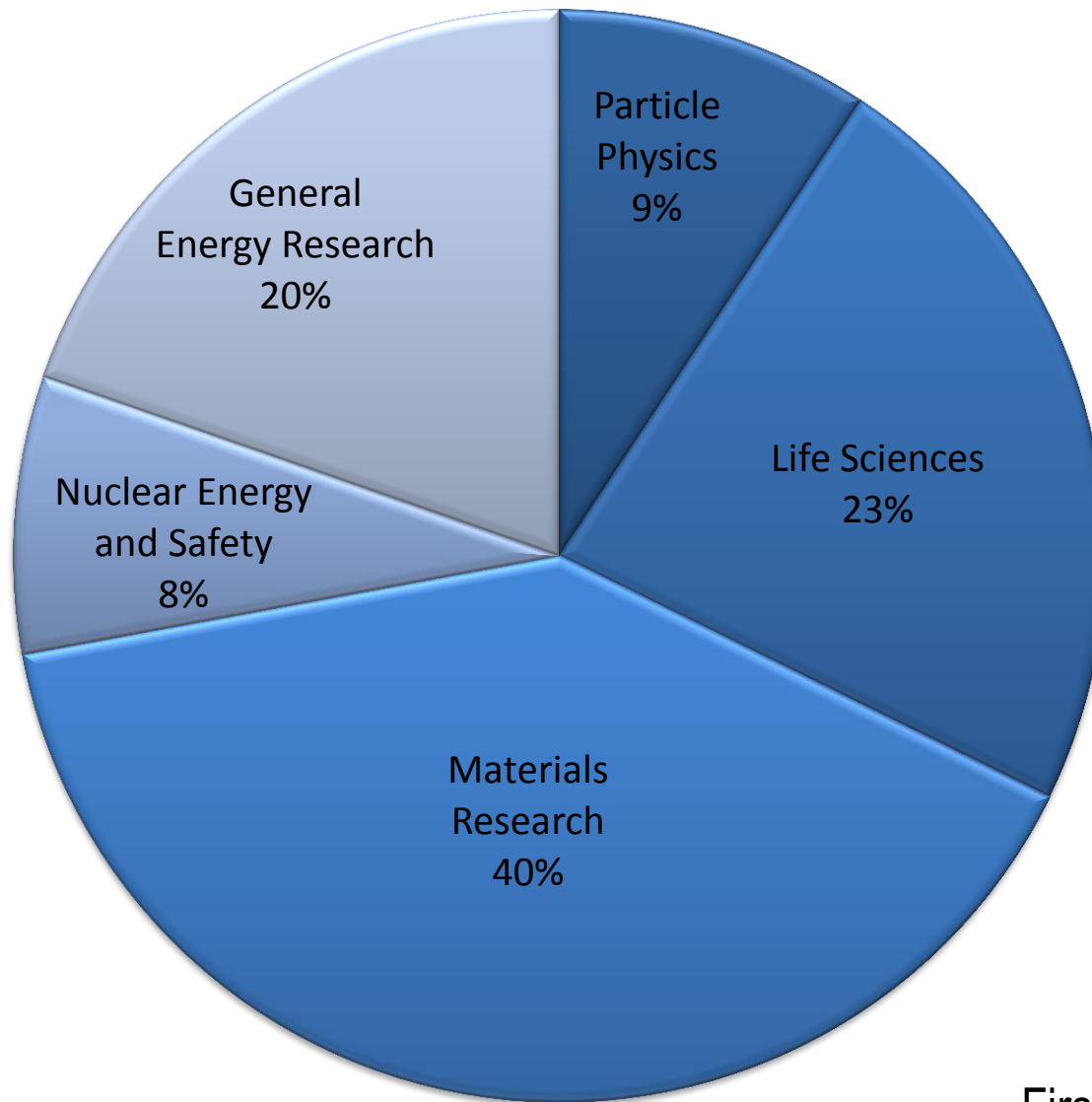


PSI funds (global budget)	~ 260	MCHF
External funding	~ 100	MCHF
Staff	~ 1900	
. externally financed	~ 400	
. doctoral students	~ 300	
. apprentices	~ 100	
External users: head counts / visits	~ 2600 / 5400	
Number of scientific publications	~ 1200 (> 11% high impact)	
PSI-employees with teaching duties at ETH and universities	~ 100	
Patient's visits (proton therapy treatments)	~ 6000	

History of research activities at PSI



Budget 2014 – Distribution to main research areas



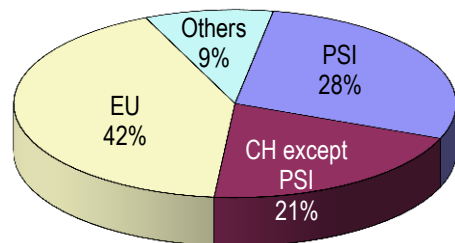
First party funding 2014

trans-national outreach

>2600 users / year

SLS: 42% from EU

average overbooking >2



impact in innovation

SLS: 10% industrial proprietary use
(other synchrotrons on average 4 %)

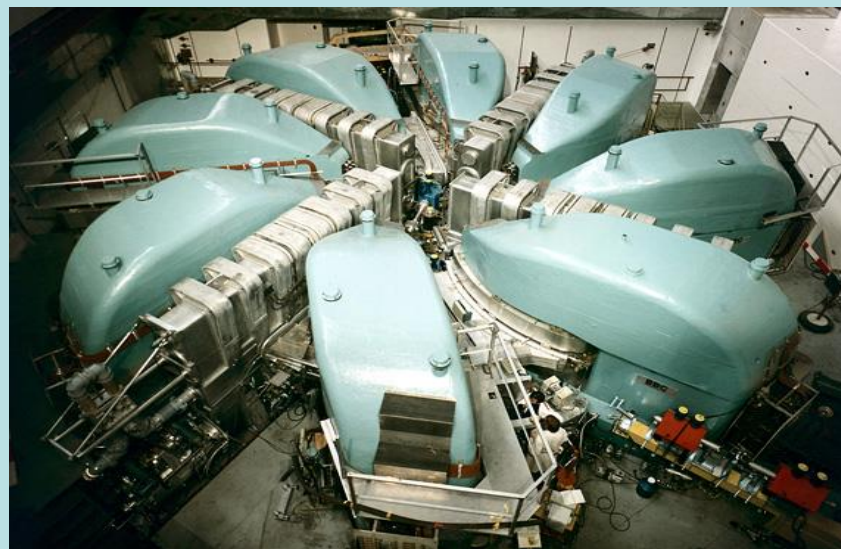


Swiss Synchrotron Light Source (SLS), Swiss Neutron Source SINQ, Swiss Muon Source $\text{Sp}\mu\text{S}$

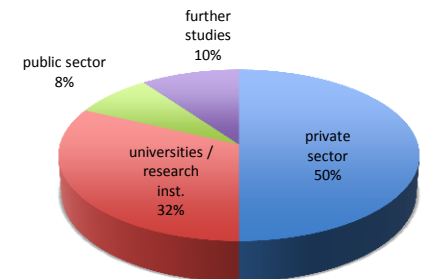
scientific excellence

>1100 publications per year

>11% publications with impact factor >7.1 (PRL)



knowledge dissemination



160 people are leaving
PSI per year (except PhD)

Particle accelerators at CERN and PSI

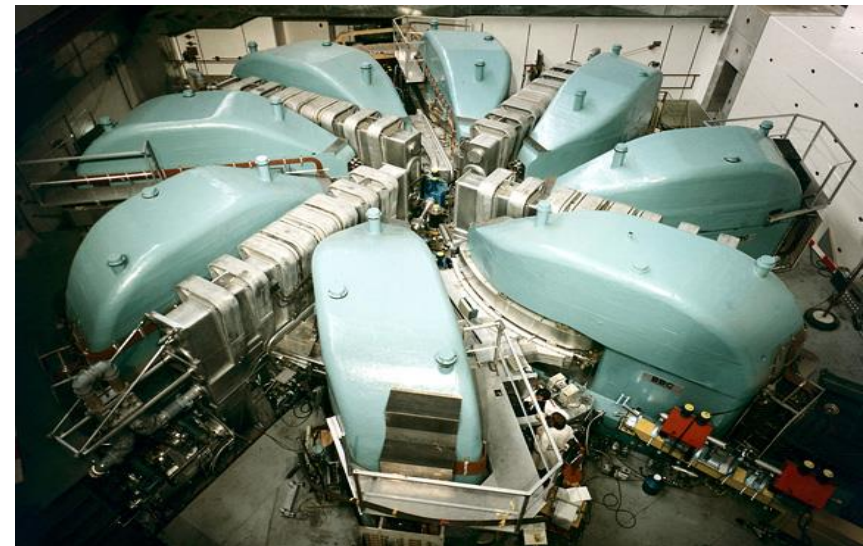
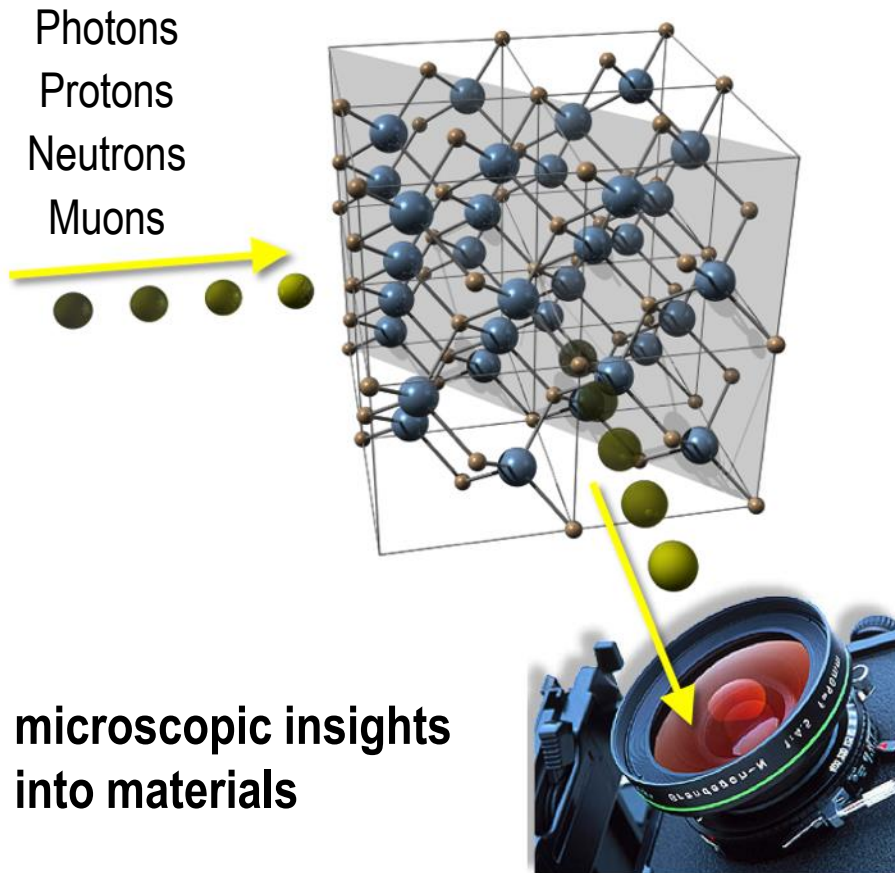


“What is matter?” sub-atomic insights
by particle collision

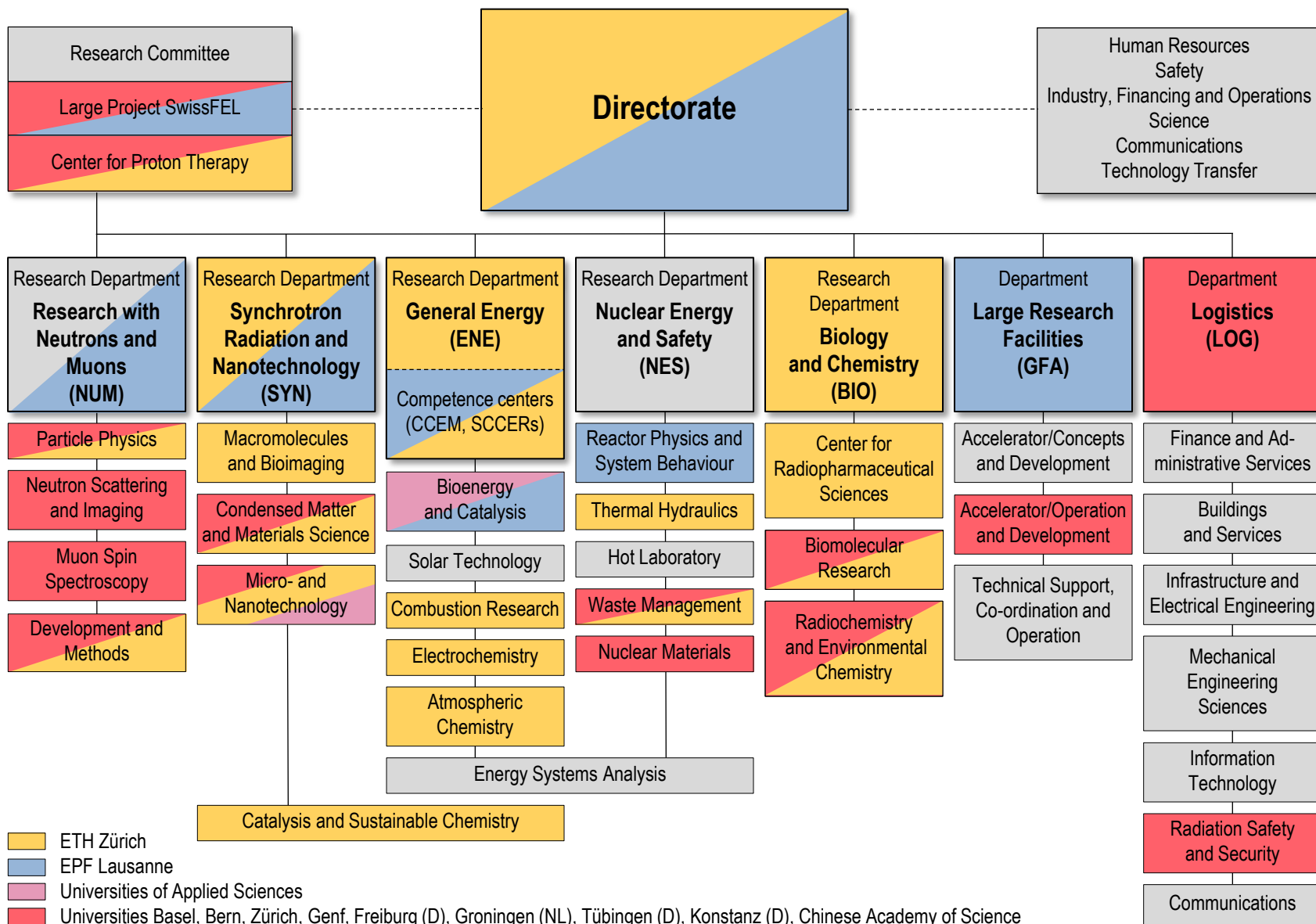


“How work materials?”
microscopic insights

Research at large-scale facilities



Joint affiliations with academia





detectors
state-of-the-art by DECTRIS



electronics
oscilloscope on a chip



accelerator technology
dedicated medical cyclotron (Varian)

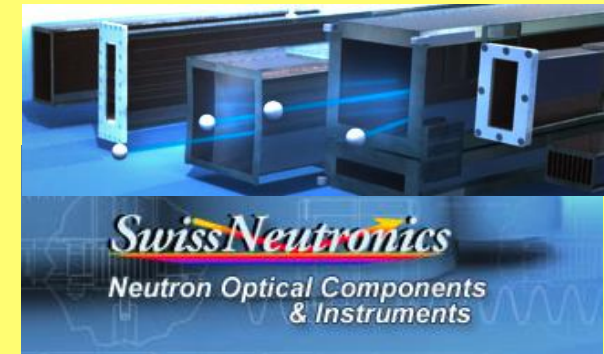


fuel cells
components and system integration

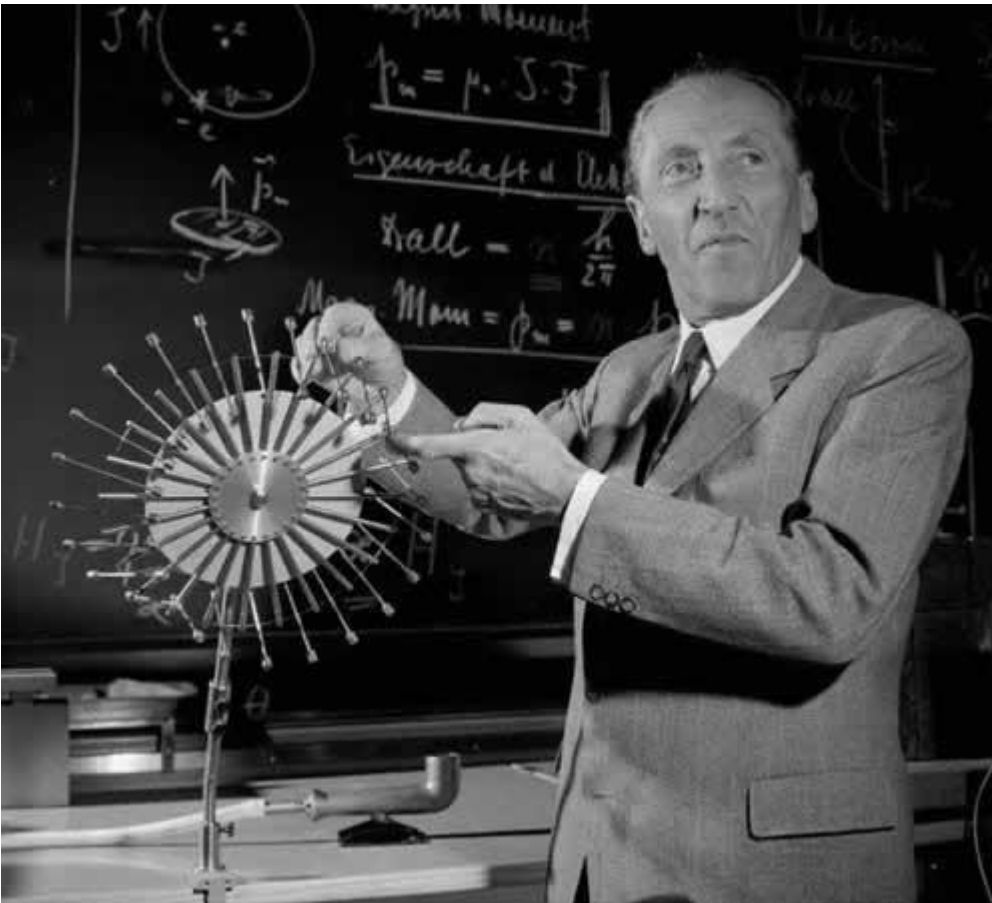


get ready for
SwissFEL

fast detectors / electronics
EIGER - next gen. single-chip detector



neutron optics
components by SwissNeutronics



- Studied physics and mathematics at the Swiss Federal Institute of Technology (ETH) Zurich, in Koenigsberg and Goettingen in Germany
- 1920: Professor for Experimental Physics at ETH Zurich, 1927: Director of the Institute of Physics. Became well-known for the clarity of his lectures
- Researched X-ray scattering on crystals, liquids and gases. Later research work was in nuclear physics
- 1946: President of the Swiss Study Commission on Atomic Energy
- Involved in the founding of CERN

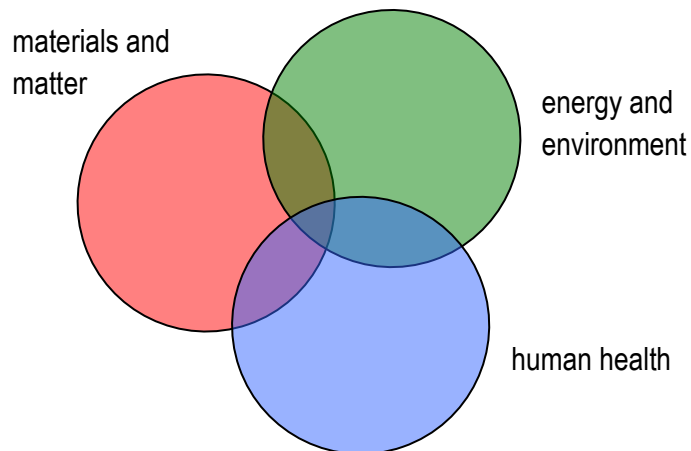
High-impact publications 2013 (with PSI co-author)

5-year-impact-factor >= PHYS REV LETT

JOURNAL	ISSN	IMPACT	#PUBL
ACS NANO	1936-0851	11.171	2
ACTA CRYSTALLOGR A	0108-7673	30.646	1
ACTA CRYSTALLOGR D	0907-4449	7.038	2
ADV FUNCT MATER	1616-301X	9.92	1
ADV MATER	0935-9648	12.813	1
ANGEW CHEM INT EDIT	1433-7851	13.195	5
ARTHRITIS RHEUM-US	0004-3591	7.979	1
ASTROPHYS J SUPPL S	0067-0049	11.438	1
BIOL PSYCHIAT	0006-3223	9.247	1
BIOMATERIALS	0142-9612	8.415	2
CHEM REV	0009-2665	42.054	2
CURR BIOL	0960-9822	10.881	1
CURR OPIN STRUC BIOL	0959-440X	9.485	1
DEV CELL	1534-5807	14.202	1
EMBO REP	1469-221X	7.366	1
ENERG ENVIRON SCI	1754-5692	10.813	1
GLOBAL CHANGE BIOL	1354-1013	8.036	1
J AM CHEM SOC	0002-7863	9.766	2
J CELL BIOL	0021-9525	9.947	1
MOL CELL	1097-2765	14.202	1
NANO LETT	1530-6984	13.843	5
NAT COMMUN	2041-1723	7.396	8
NAT GEOSCI	1752-0894	11.92	1
NAT MATER	1476-1122	36.732	3
NAT NANOTECHNOL	1748-3387	33.781	1
NAT PHOTONICS	1749-4885	30.773	2
NAT PHYS	1745-2473	18.557	1
NATURE	0028-0836	36.235	6
NUCLEIC ACIDS RES	0305-1048	7.417	2
P NATL ACAD SCI USA	0027-8424	10.472	7
PHYS REP	0370-1573	20.574	1
PHYS REV LETT	0031-9007	7.013	53
REV MOD PHYS	0034-6861	44.436	1
SCIENCE	0036-8075	32.452	3

category size 290
category use 34

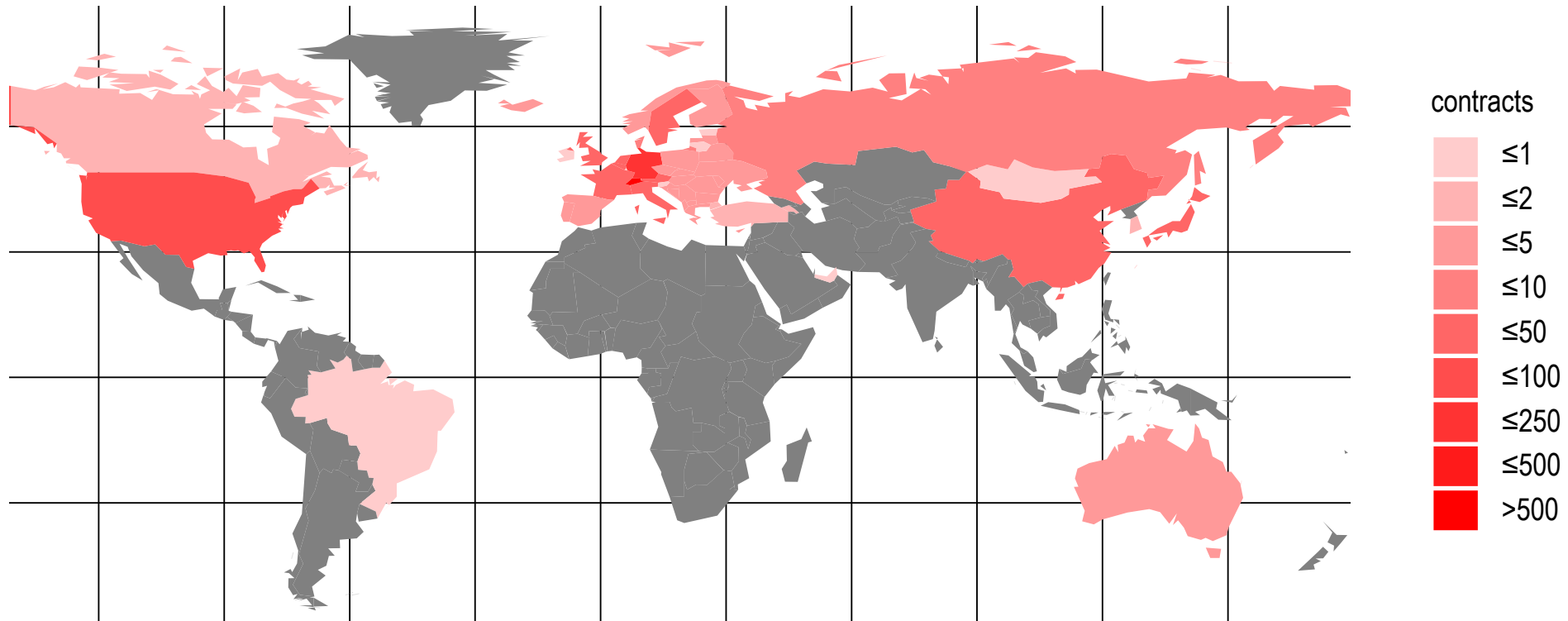
total publications 1108
publ. in category 123
fraction 11.1%



**11% (10%) of publications with impact factor >7
in more than 34 (30) different journals**

source: ISI Web of Knowledge analysis
only publications with PSI authors or co-authors

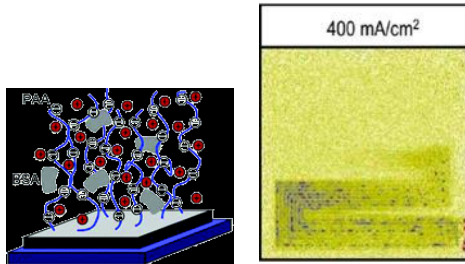
quantity, quality, breadth



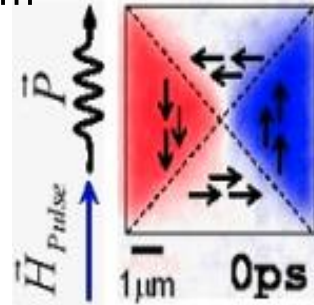
1046 active collaboration contracts

Examples of research at large scale facilities of PSI

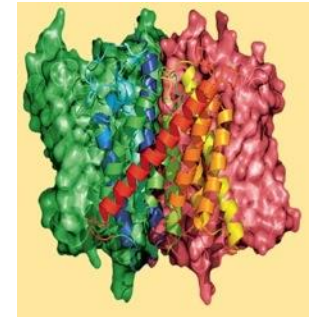
fuel cells



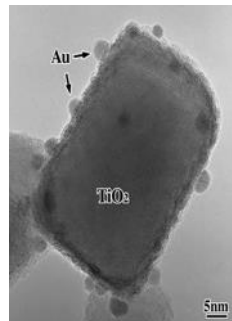
magnetism



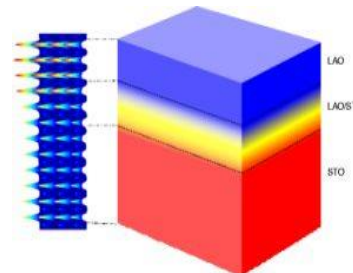
proteins



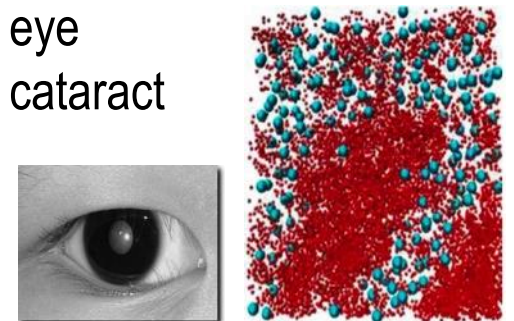
catalysts



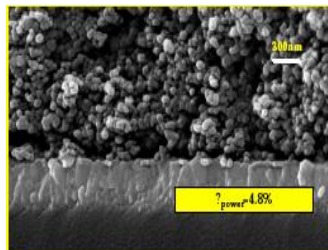
thin films



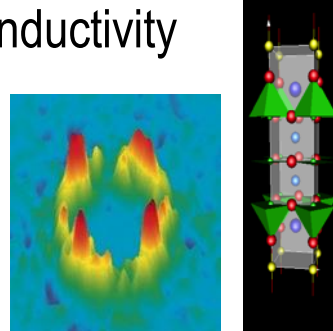
eye cataract



nano photovoltaics



superconductivity



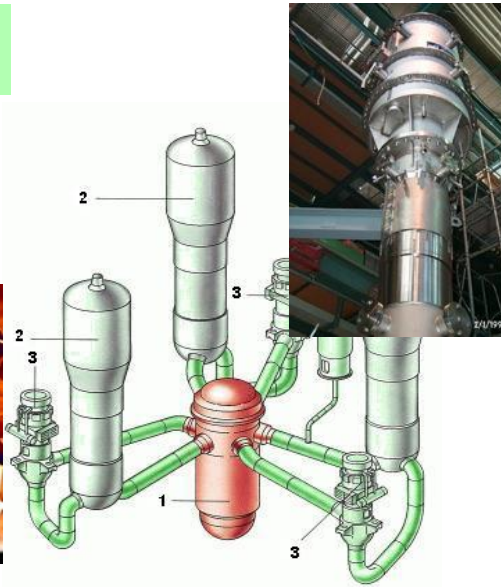
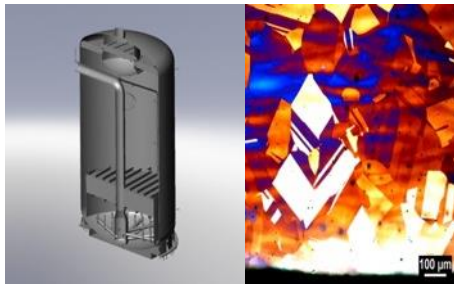
disk of Nebra

(museum Halle (D))



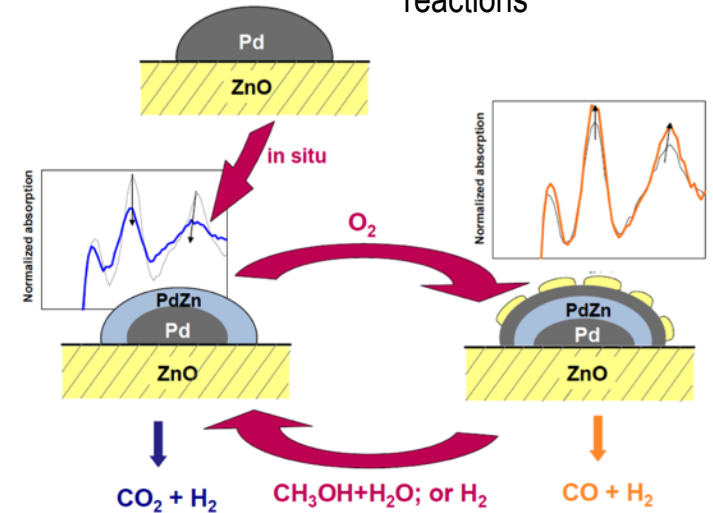
NES/Safety

- Understanding processes
- Monitoring materials aging

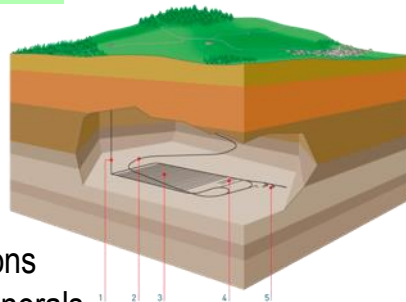


ENE/Catalysis

- Understanding and better use of catalytical reactions

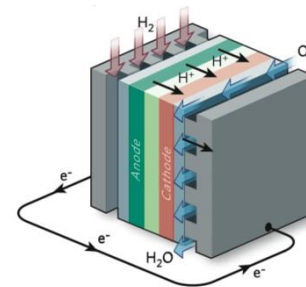


NES/Waste Management

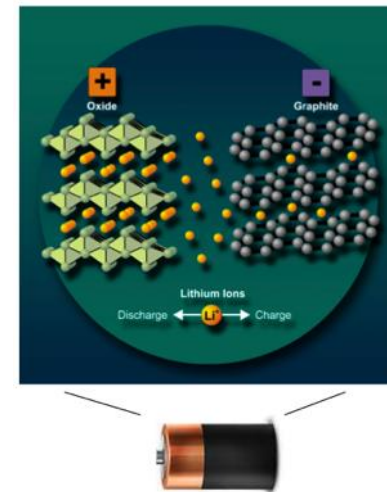


- Understanding of interactions radionuclides and rocks/minerals
- Studies for final waste repositories

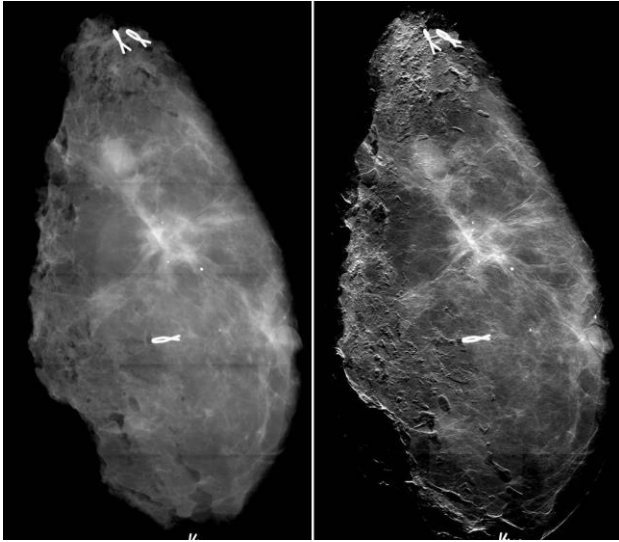
ENE/Electrochemistry



- Fuel cells

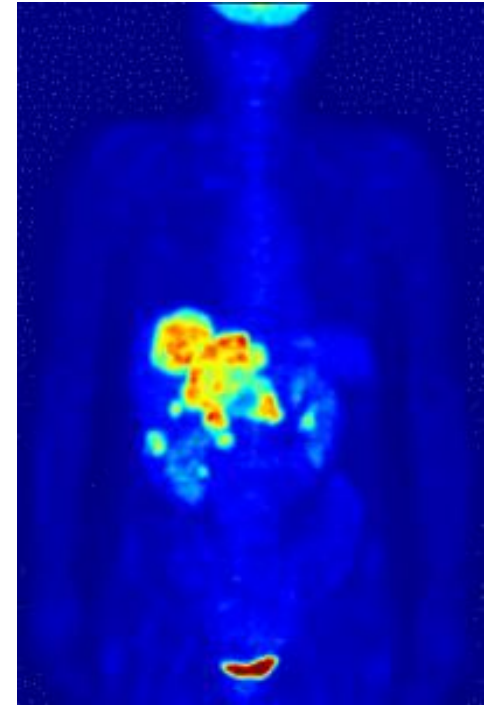


- More efficient batteries

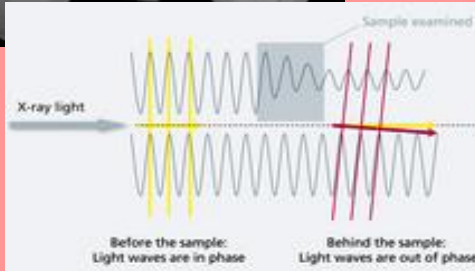
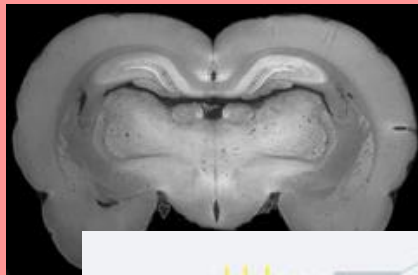


X-ray phase contrast
improved imaging
diagnostics

radiopharmacy
for diagnostics
and therapy

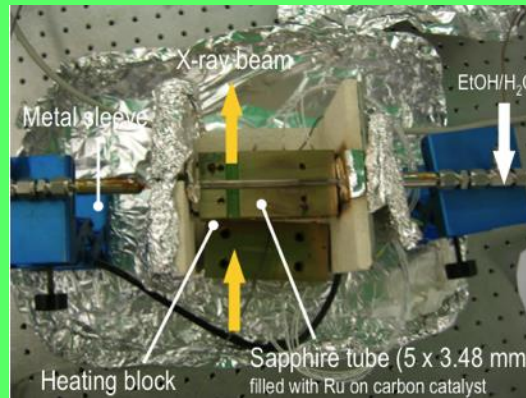


proton therapy
improved radiation
therapy



life sciences
bioimaging

PNAS



get ready for SwissFEL

energy research / chemistry
catalysis studied *in-situ*

Datum: 05.01.2011

Neue Zürcher Zeitung

Auf sauberem Weg zum flüssigen Treibstoff

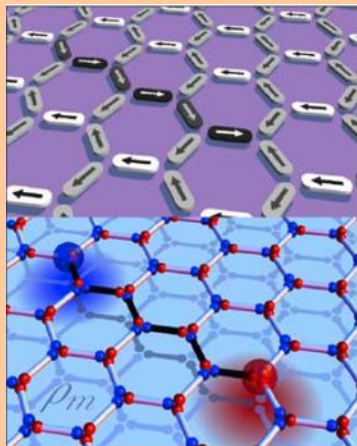
Gewinnung von Benzin aus Wasser, Kohlendioxid und Sonnenlicht

Spe. · Wenn heute die Vorzüge von langem bekannt. Es fehlt jedoch eine spröchligen Form vorlag. Übrig blieb Elektro- oder Wasserstoffausgang: wackame Technik zur Trennung der reinen «Syngas». Dieser thermochemischen Zyklus liess sich über 500-mal wiederholen, ohne dass das Metalloxyd Anzeichen der Ermüdung zeigte.



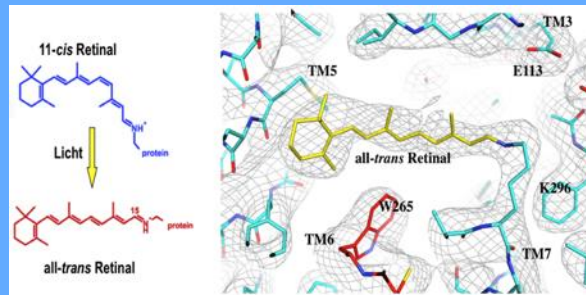
energy research
solar chemistry

Science
“Golden Idea Award”



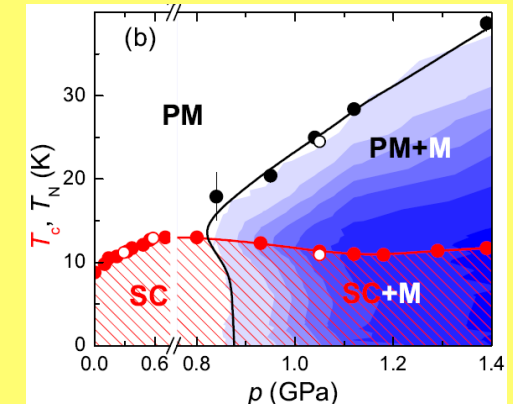
Nature
Physics

materials sciences / IT
magnetic monopoles



Nature

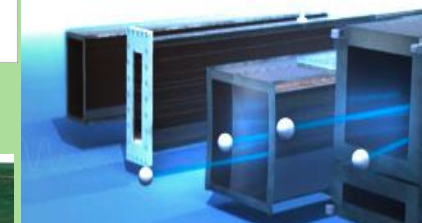
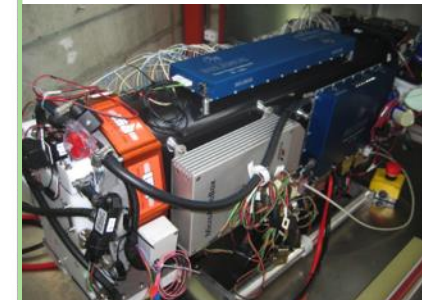
structural biology
sight process deciphered



Phys. Rev. Lett.

materials sciences / energy
superconductivity and magnetism

PSI serving 'locally' & 'globally' research and industry



SwissFEL 2016

