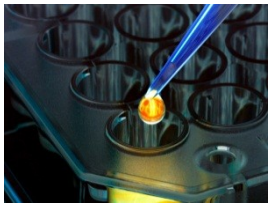
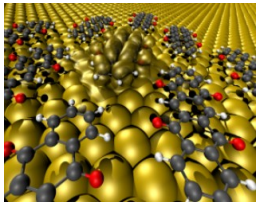
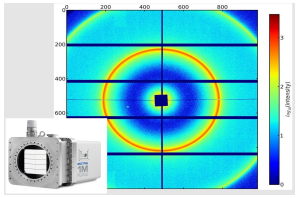
Cooperations and Highlights





of the non-university research institutions in Adlershof

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Initiativgemeinschaft
Außeruniversitärer
Forschungseinrichtungen
in Adlershof e.V.

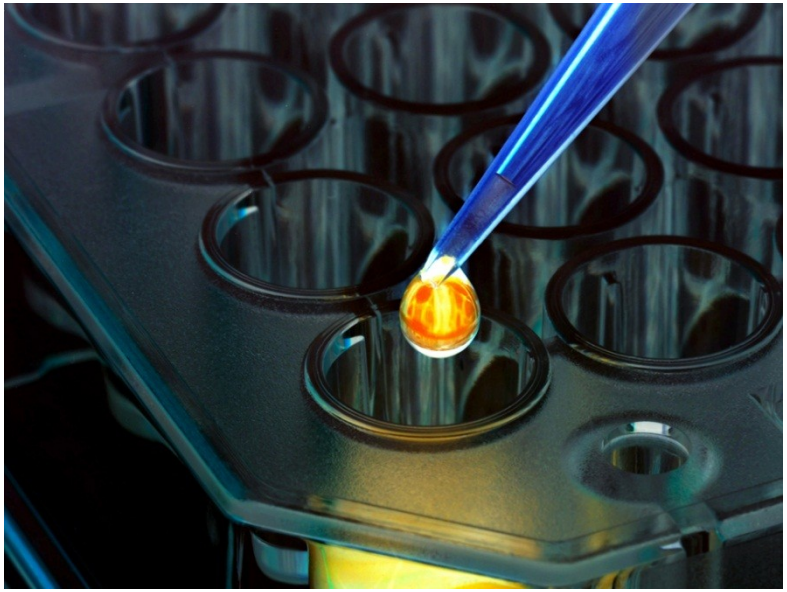
BAM
Bundesanstalt für Materialforschung und -prüfung

School of Analytical Science: SALSA

IGAFA

Analytical Sciences are at the core of many of today's fundamental and applied scientific problems and innovations. The School of Analytical Sciences Adlershof (SALSA) contributes to a renaissance and renewal of Analytical Sciences.

Funded with 1.7 Mio. € p. a. via the German Excellence Initiative, SALSA offers an integrated curriculum with a focus on case-based learning and industry cooperation. By the end of 2014, more than 60 doctoral students will work within SALSA together with more than 50 faculty members from Humboldt-Universität zu Berlin, ETH Zurich, TU Berlin, University of Potsdam, BAM, HZB, ISAS, the MPI of Colloids and Interfaces Golm, PTB and ZIB.



to measure is to know.
SALSA

Brandenburgische
Technische Universität
Cottbus

IGAFA

Synergism through Adlershof´s co-operation

The competence of the IUT (Prof. Leonhardt) in the field of low-temperature plasma (NTP) research has been combined with the competence of the BTU. Chair for Atmospheric Chemistry and Air Pollution Control in the field of photocatalysis to a new-type fall film reactor for treatment of polluted water.

Photocatalysis is a widely studied principle but there is still a large need in reactor design studies. Plasma has been already commercial applied for air cleansing and disinfection but only very few groups deal with plasma treated water purification. To our knowledge there exist no works combining DBD plasma (dielectric barrier discharge) with photocatalysis on an immobilized layer of TiO2.

In this way the external ozone generator is not longer needed, the ozone production is more efficient, combined with formation of other reactive oxygen species (ROS) close to the reactive area of the falling film and finally, the plasma light may sensitize the catalyst. We expect significant synergetic effects from such combination in mineralizing pollutants together with a more efficient energetic balance.

Leibniz
Ferdinand-Braun-Institut

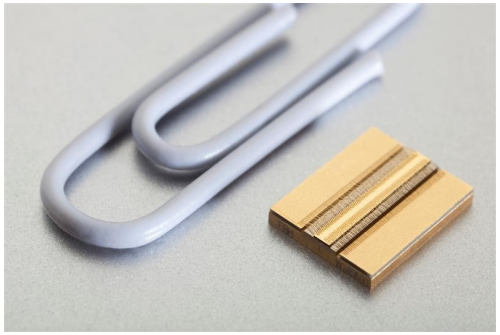
IGAFA

FBH – Jenoptik: exemplary & distinguished technology transfer

- **long-term, close research cooperation** including a great variety of new developments and advancements ►► ensuring international market and technology leadership

- resulted in the **founding of spin-off Jenoptik Diode Lab** GmbH
  - 2002: spun-off from the FBH
  - 2006: own semiconductor factory in Berlin-Adlershof – in close neighborhood to the research partner FBH
  - 2012: doubling of the production capacity

- 2012: **Transfer Award WissensWerte**
  for sustainable transfer of specifically powerful diode lasers for materials processing:
  - 12 Watt = improved output power by 20%
  - high energy efficiency of 63%
  - application: direct materials processing (= as replacement for so far used CO2 and solid-state lasers)



Leibniz
Ferdinand-Braun-Institut

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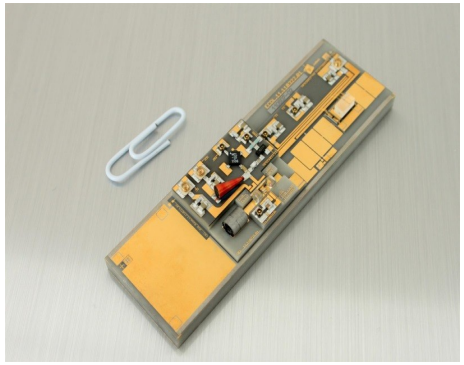
Competence in Space:

robust & capable diode laser modules



- space-compatible and robust technology
- compact – due to hybrid integration (diode lasers, optics, electronics)
- small dimensions & low weight
- 25% energy efficiency (conversion of electrical into optical power)
- output power: up to > 1 W, simultaneously
- high spectral stability:
  small linewidth (sub 100 kHz FWHM / 100 µs, sub-kHz intrinsic)
- April 2013, November 2014:
  missions on board of a high-altitude rocket for high-precision spectroscopy experiments in space

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DLR

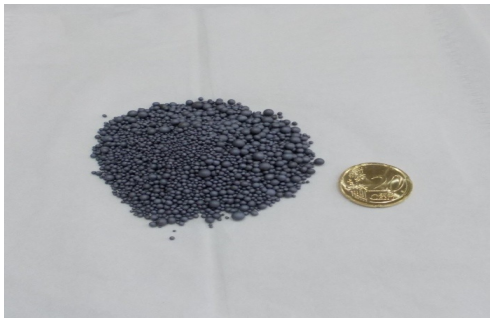
www.fbh-berlin.com

On the way to better solar cells

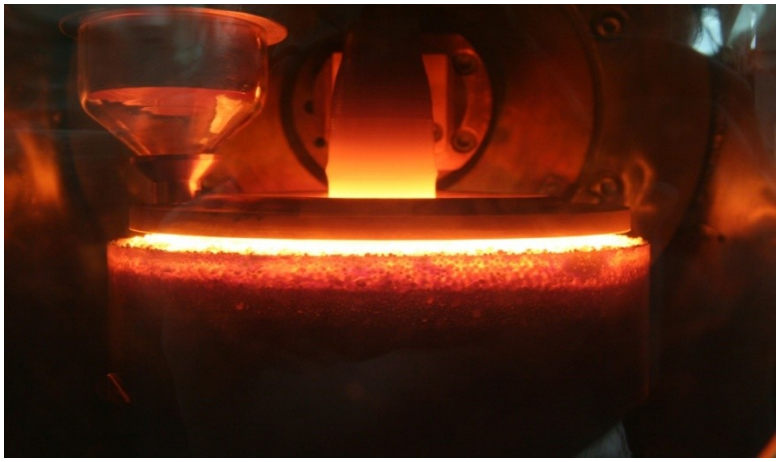
Since 2010 the Leibniz Institute for Crystal Growth (IKZ) co-operates with the company REC Solar Grade Silicon in the field of silcon crystal growth for photovoltaics.

Crystalline silicon is *the* basic material for photovoltaics as well as for the semiconductor industry and microelectronics. While for silicon chips used e.g. for computers and integrated circuits high purity silicon in highest crystalline perfection is required, in photovoltaics the focus is on low costs.

The expertise of IKZ in the field of silicon crystal growth is recognized worldwide. As a result, the Norwegian/US company REC Solar Grade Silicon contacted the institute in 2010. REC is one of the main producer of granular polysilicon and their activities cover the complete photovolatics value chain.
A current topic of this co-operation is the development of new growth processes for high purity crystals from such granules.



Silicon granules as feedstock material



During the growth, the melt is embedded in unmelted silicon

Unlike other growth methods, the process developed at IKZ prevents contamination of the feedstock material. Thus, the advantages of cheap feedstock material could be combined with a sophisticated growth technology, which has already been filed as a patent. After the required scaling, the high value single crystals could be used in high efficiency solar cells or in electronics.

Measurements for next-generation chip fabrication

The long-lasting (since 1998) cooperation between PTB and the Carl Zeiss SMT GmbH company has been extended in 2012 for yet another 4-year period. Measurements at PTB contribute to substantiate the quality of Zeiss' optics used in so-called steppers (lithography tools) from the Dutch company ASML which is world market leader in this field. By use of synchrotron radiation from the BESSY II and the PTB-owned Metrology Light Source (MLS) electron storage rings, the optics are characterised at their working wavelength in the extreme ultraviolet spectral range (EUV).

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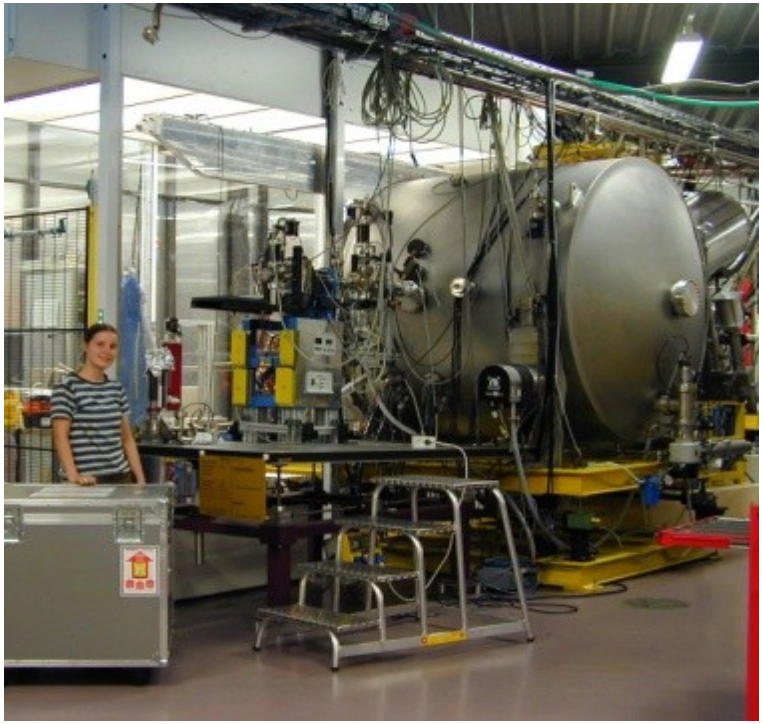

Image: PTB's EUV reflectometer for characterisation of large optics

Metrological characterisation of micro-vesicles

In co-operation between the PTB and the DECTRIS company, a vacuum-compatible X-ray detector has been developed for determination of the size of nano-objects with poor contrast. Using the method of Small-Angle X-ray Scattering (SAXS), PTB in its laboratory at BESSY II now can determine the size of nanoparticles like e.g. micro-vesicles. Thus, the metrological fundament for the application of such biomarkers is created.

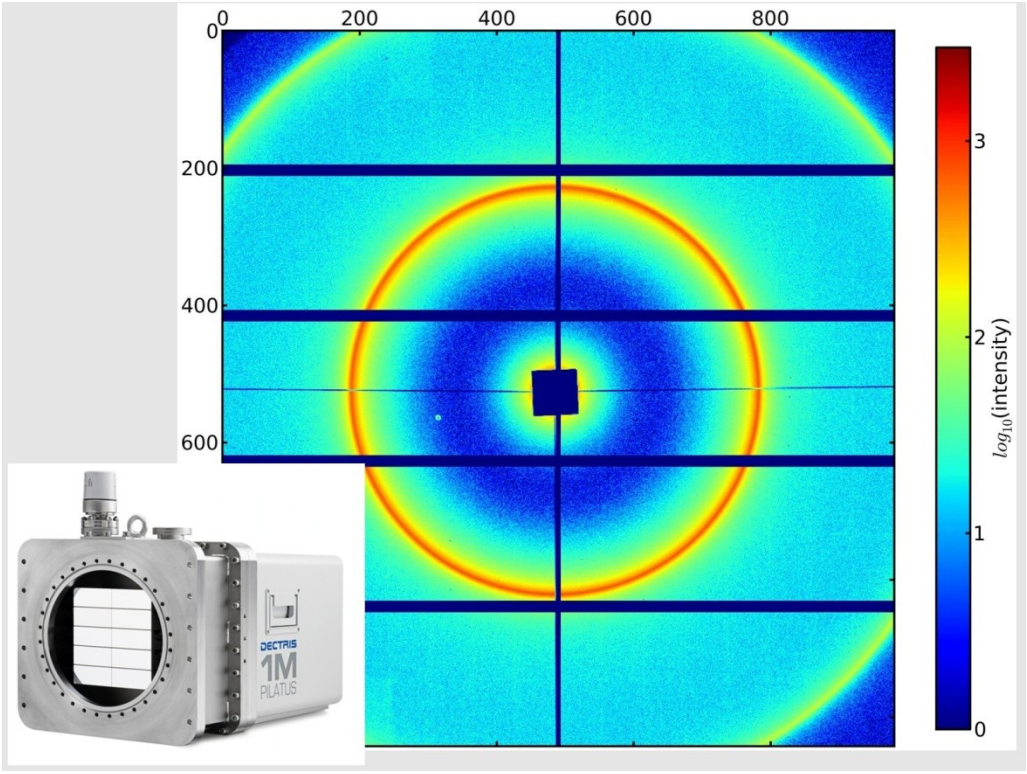

Image: Small-angle X-ray scatter diagram of a multi-lamellar liposome sample; in-vacuum PILATUS 1M detector from DECTRIS

Non-university research institutions in Adlershof

11 Non-University Research Institutions:

- 1,800 staff members
- incl. 1,000 scientists

Per annum:

- 1,000 publications
- 500 conference talks
- 500 patents (total)
- 2012: approx. 180 long-term guests from 30 countries

Non-university research institutions in Adlershof

BAM Bundesanstalt für Materialforschung und -prüfung
Abt. I, „Analytische Chemie; Referenzmaterialien“

HZB Helmholtz-Zentrum für Materialien und Energie

- Elektronenspeicherring BESSY II
- Institut für Silizium-Photovoltaik

BTU Brandenburgische Technische Universität Cottbus,
Arbeitsgruppe Luftchemie

DLR Deutsches Zentrum für Luft- und Raumfahrt e.V.

- Institut für Planetenforschung
- Institut für Verkehrssystemtechnik
- Einrichtung Optische Informationssysteme
- Projektträger des BMBF für Informationstechnik

FBH Ferdinand-Braun-Institut,
Leibniz-Institut für Höchstfrequenztechnik

Helmholtz Zentren · Leibniz-Institute · Ressortforschung

Außeruniversitäre Forschungseinrichtungen in Adlershof

IGAFA

IKZ Leibniz-Institut für Kristallzüchtung

ISAS Leibniz-Institut für Analytische Wissenschaften

LIKAT Leibniz-Institut für Katalyse e.V. an der Universität Rostock – Außenstelle Berlin

MBI Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie

PTB Physikalisch-Technische Bundesanstalt, Fachbereich Radiometrie mit Synchrotronstrahlung