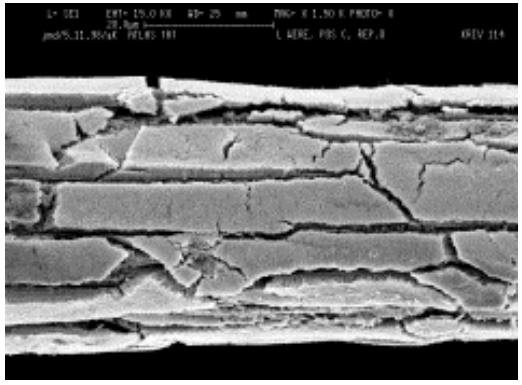
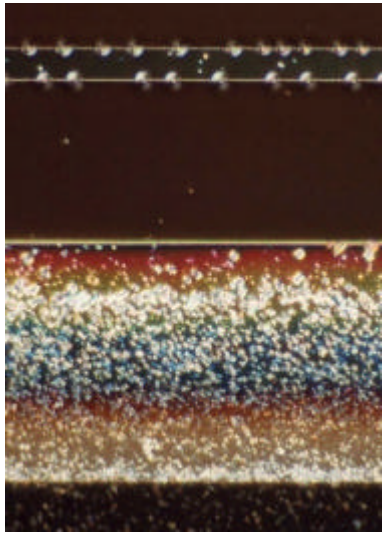
International Workshop on Aging Phenomena in Gaseous Detectors 2.-6. October 2001





Albrecht Wagner

Welcome

DESY - Overview

Mission:
- Development, construction and running of accelerators
- Exploit the accelerators for particle physics and research with synchrotron-radiation (SR)

Internationally used, nationally funded Research Institute

Budget:	301 MDM
Staff:	1150 in Hamburg and Zeuthen

Particle Physics at HERA:
1220 scientists (25 countr.)
820 from outside Germany

Research with SR:
2130 scientists (33 countr.)
700 from outside Germany

TESLA

Superconducting e^+e^--collider + X-ray laser laboratory
1134 authors from 304 institutes in 36 countr. contributed to Technical Design Report

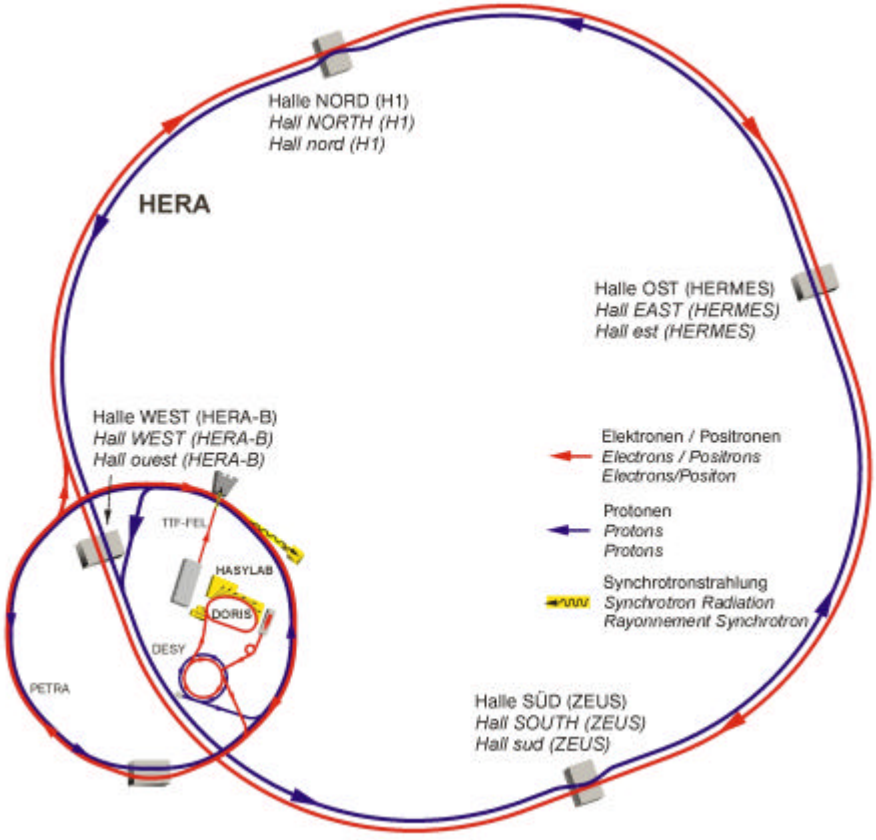
DESY at Hamburg and Zeuthen

DESY -Hamburg

DESY -Zeuthen

DESY's Accelerators - now

DESY-DORIS-PETRA-HERA:



TTF-Linac:

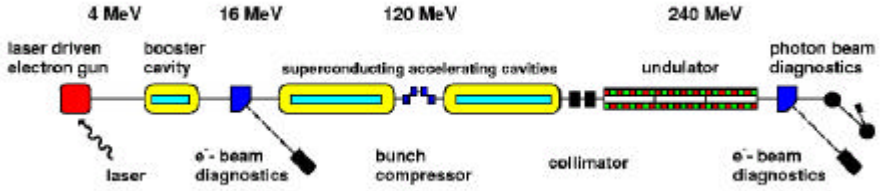
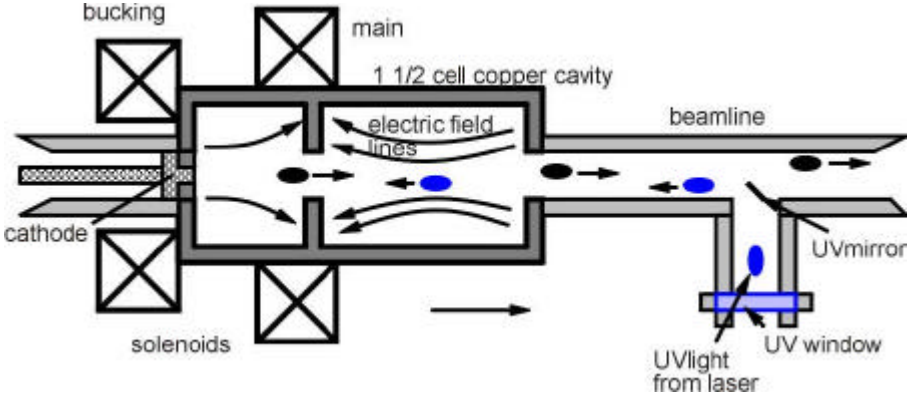
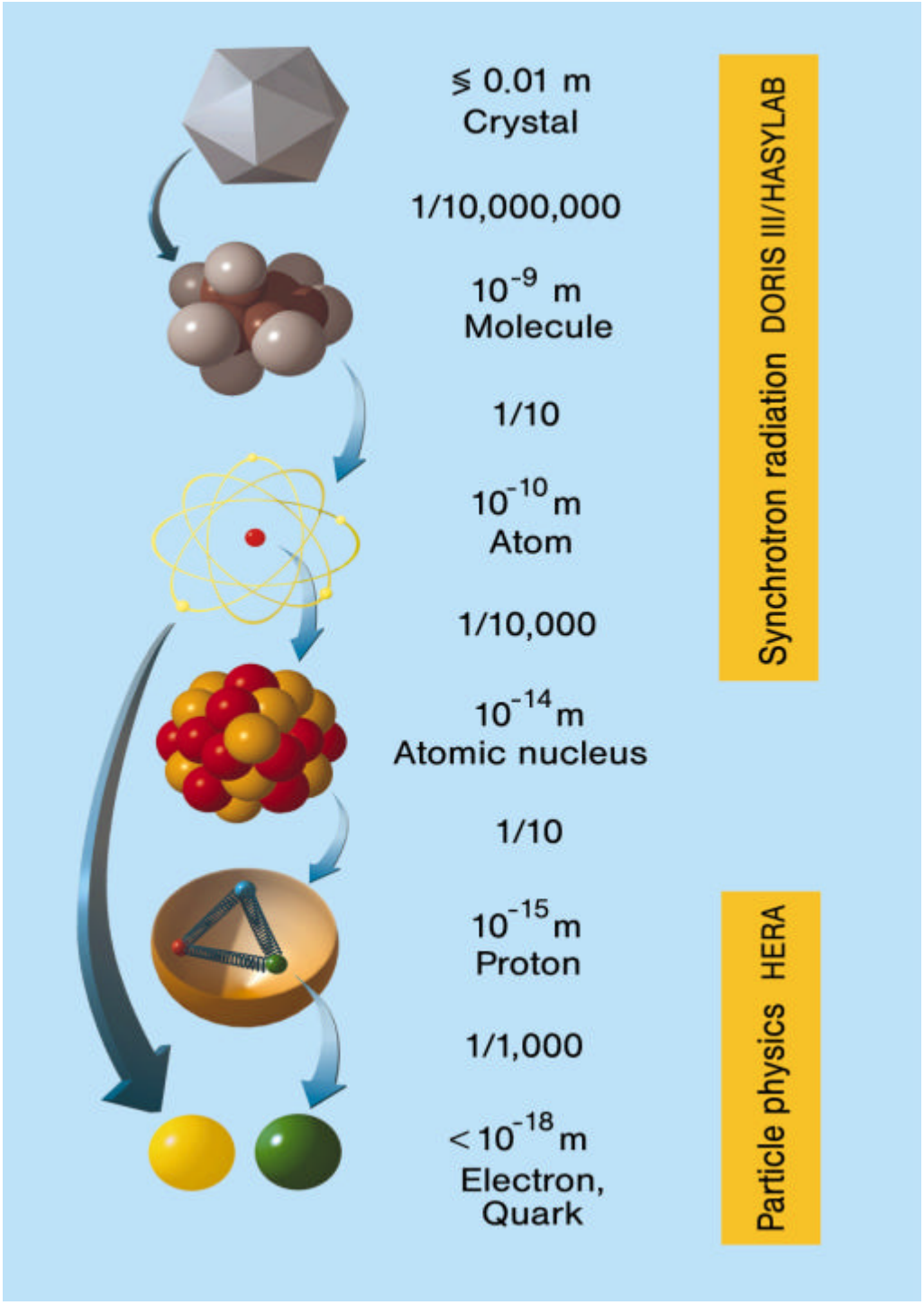


Photo-Injector at Zeuthen:





DESY - Research

Study of the structure of matter from macroscopic to atomic scale

Structure of elementary particles, forces + origin of mass

Theory in particle physics + cosmology

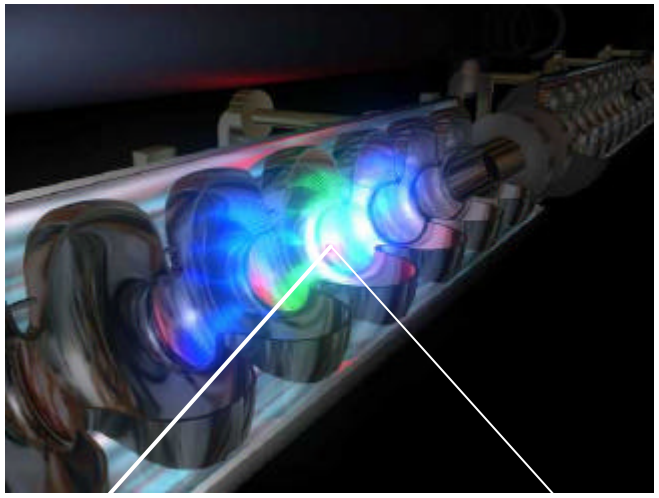
Origin of cosmic high energy neutrinos (Amanda, IceCube at the S. Pole)

Detector R&D

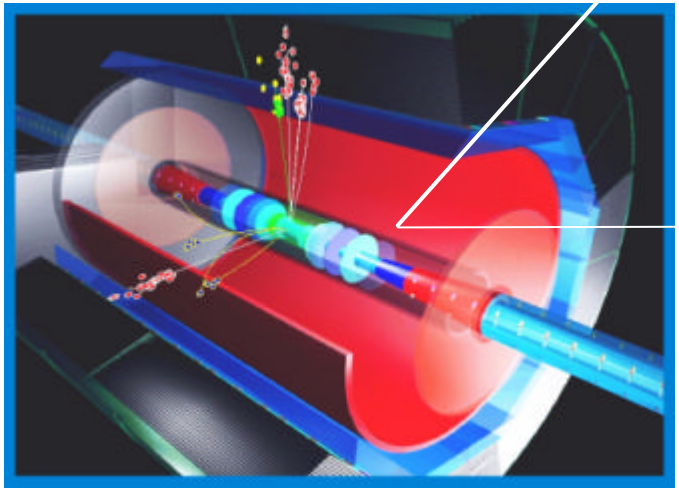
Accelerator R&D

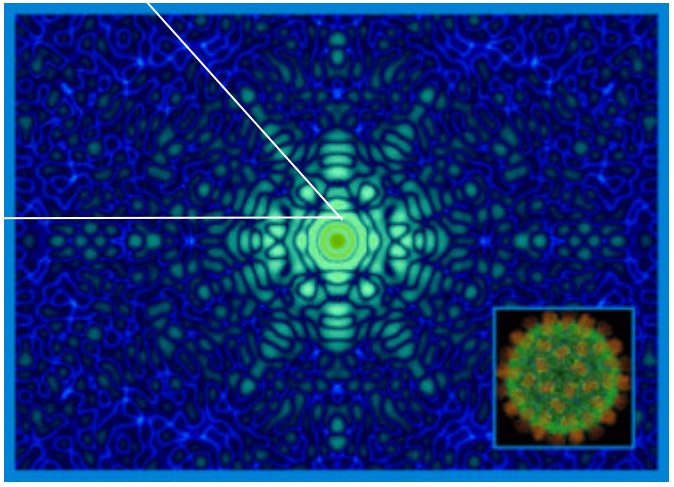
Introduction

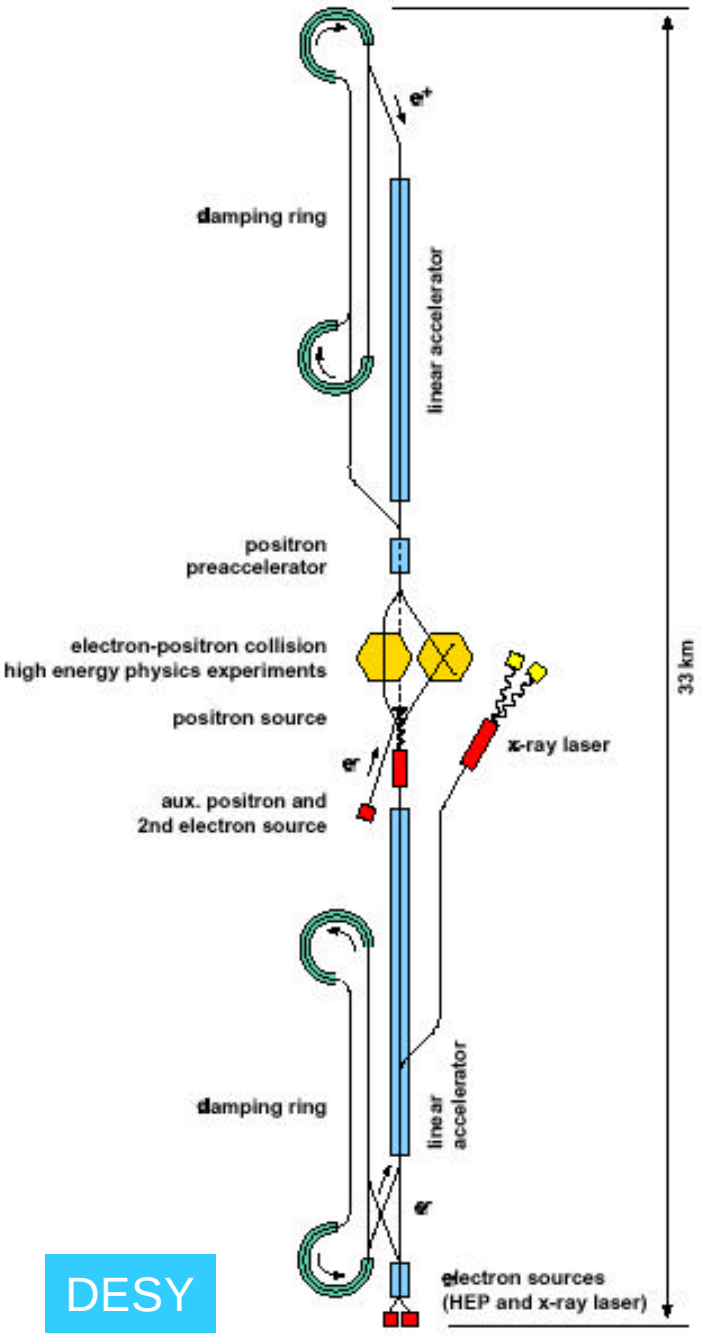
An international, interdisciplinary centre for research



...from the origin of matter to the fundamental principles of life







DESY

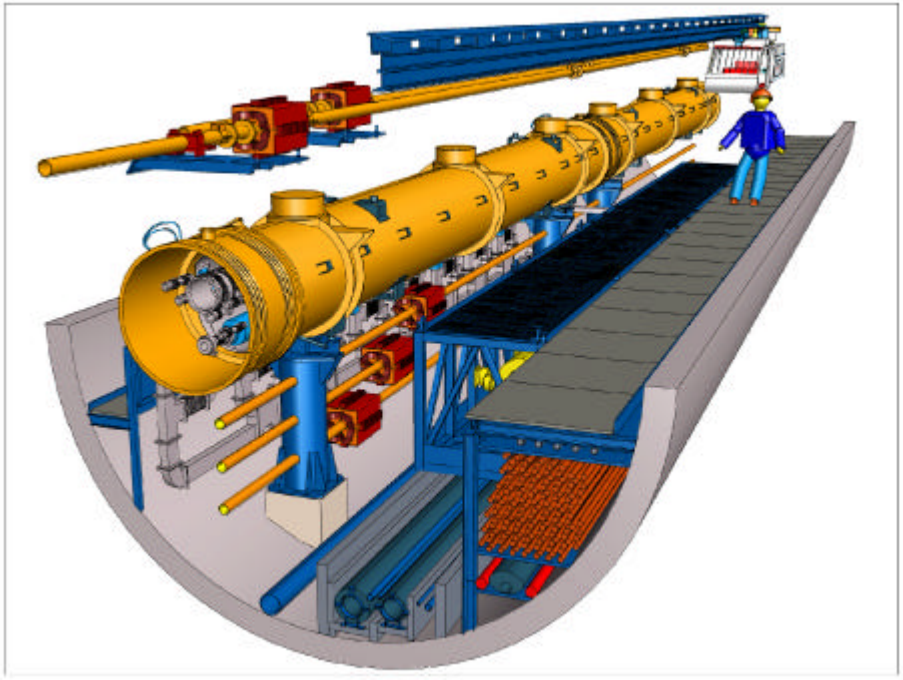
TESLA

How to Reach ~ 1000 GeV

Linear Collider: $200 < E < 800$ GeV

High Luminosity: $3\ 10^{34}\ cm^{-2}\ s^{-1}$

(requires very low emittance beams)



The Authors of the Project

- The TESLA Collaboration:

- more than 40 Institutes in 10 countries

- major hardware contributions from France, Italy, USA and DESY

- Co-operation with CERN, Jlab, KEK on SC cavities

- The Study Groups:

ECFA/DESY Studies

10 XFEL - Workshops

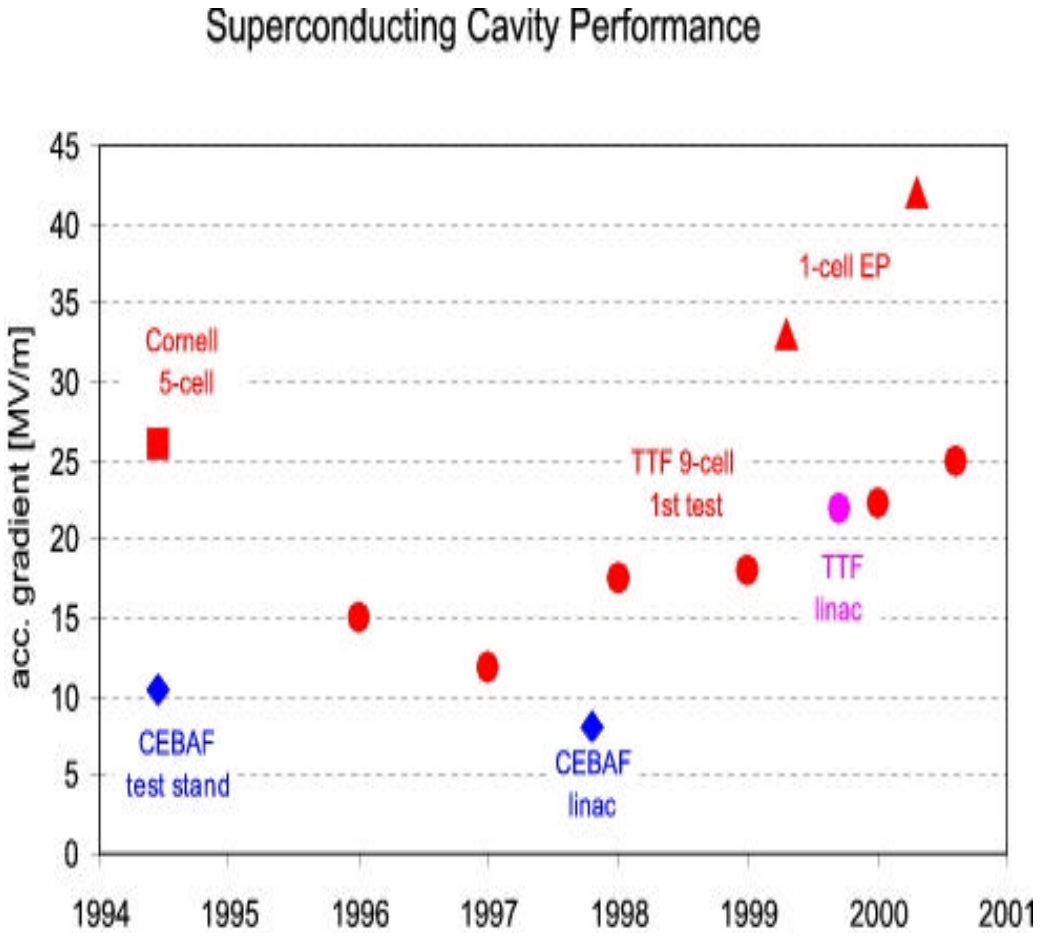
- The Editors

- The Authors of the TDR:

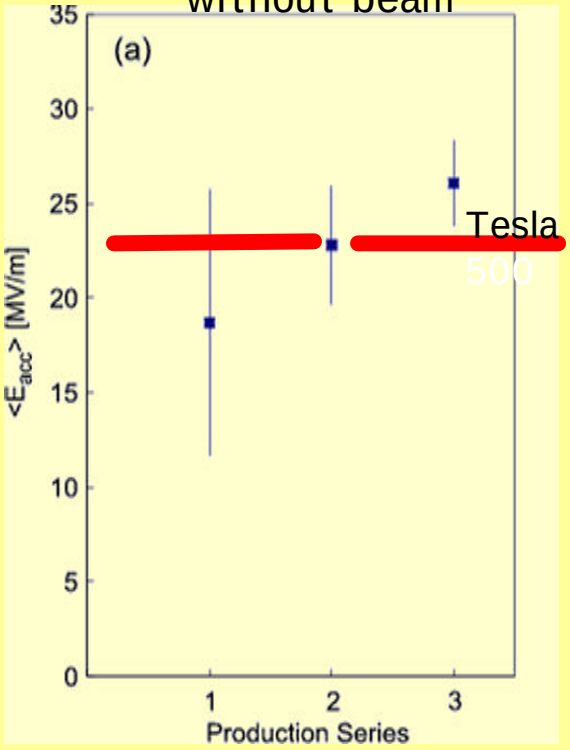
1134 authors from 36 countries

History of Cavity Development

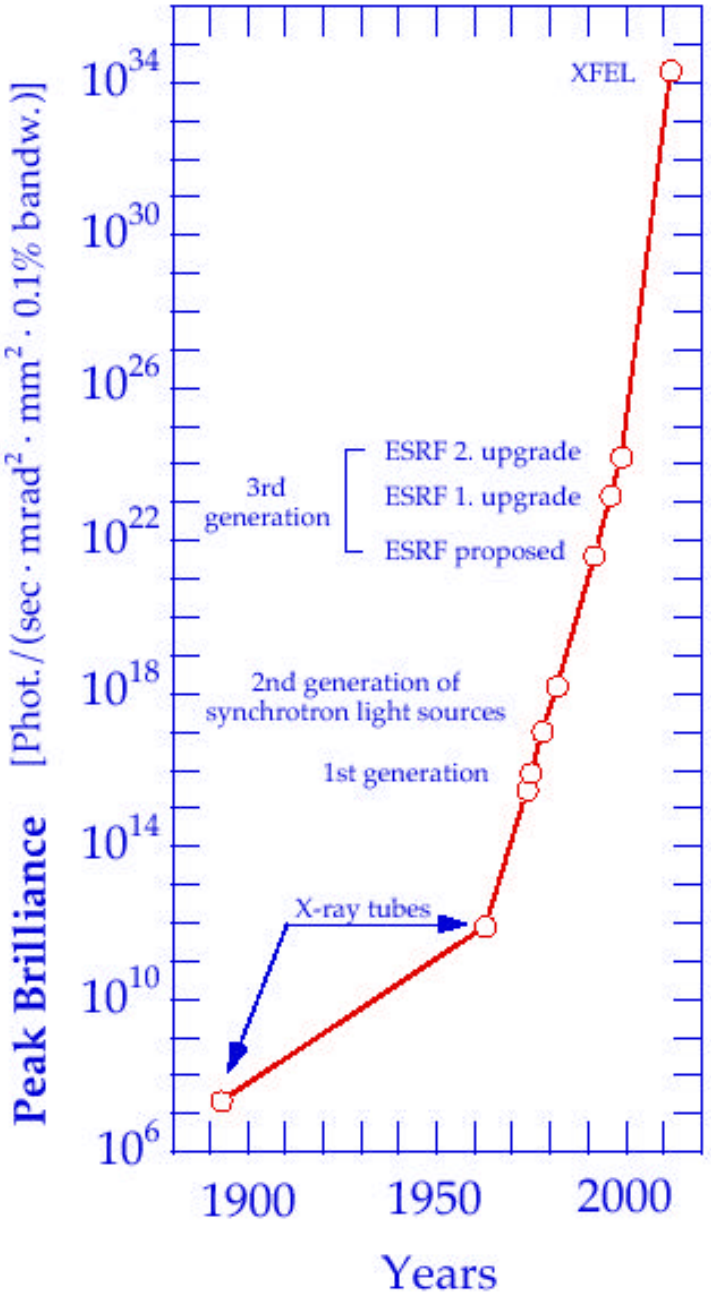
The TESLA Collaboration was able to increase the performance of SC cavities by a factor 4-5 since 1992, while reducing the cost by a factor 4



cavity performance
per production series
without beam



TESLA as X-ray Laser



- Wavelength of atomic dimensions
  > 0.1 nm
- Highest brilliance
  ~ 10^9 times that of sources of the 3. generation
- Very short pulselength
  100 fs
- Tunable in wavelength
- Coherence

Scientific Applications of a 0.1 nm Laser

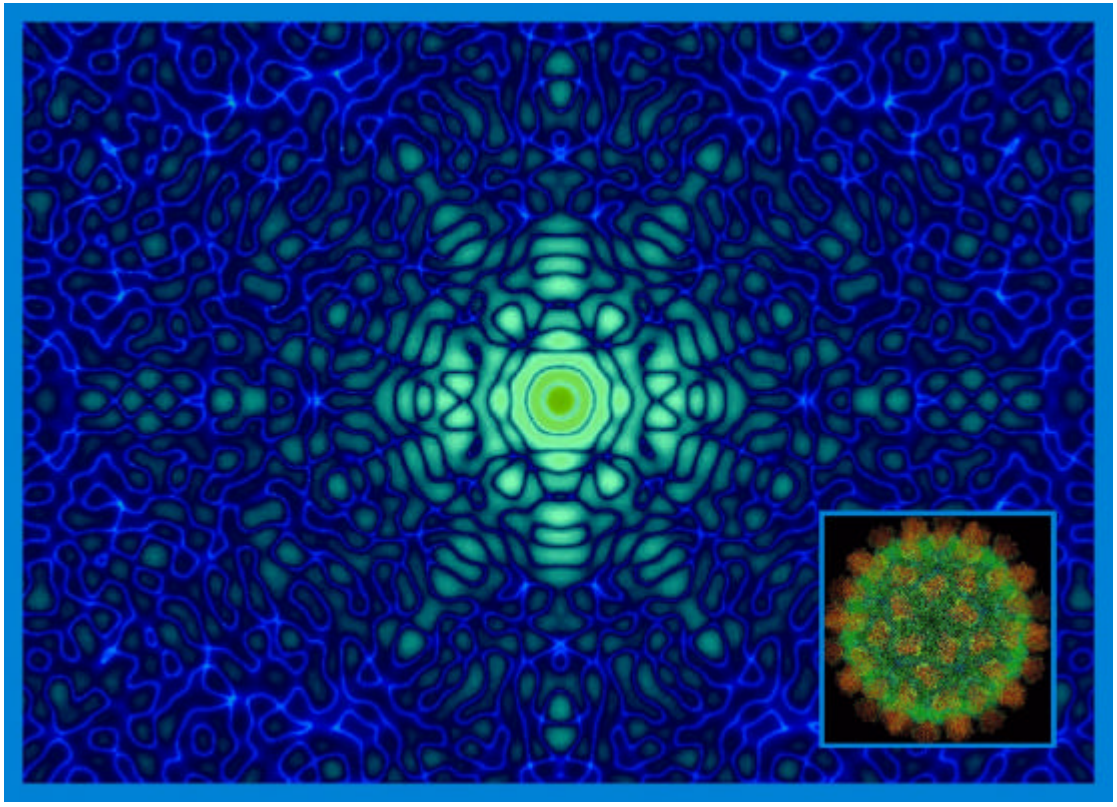
dynamic behaviour of electrons in chemical bonds

movies of chemical reactions

real-time studies of formation of condensed matter

pictures of single macro-molecules

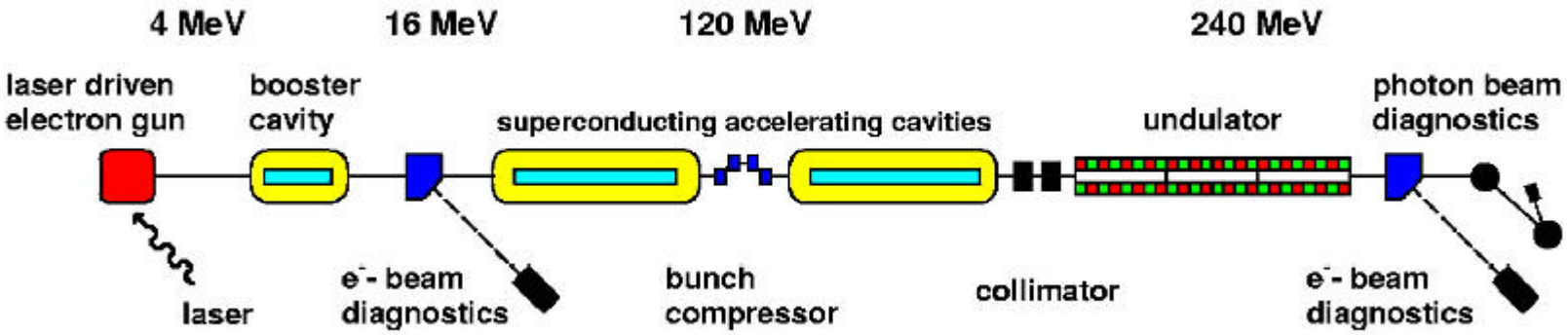
imaging of bio-molecular assemblies with atomic resolution



Fields of Application: Atomic and molecular physics, Material science, Biology, Fundamental plasma physics

Possible industrial use in 5-7 years for chip production (30 nm)

The TESLA Test Facility



Operation for > 3 year (~ 9000 h)

Test of all components

Proof of SASE principle around 100 nm

Base for costing

Status of TTF-FEL

FEL running almost routinely

Saturation observed (10.9.01)

Gain: $10 * 10^6$

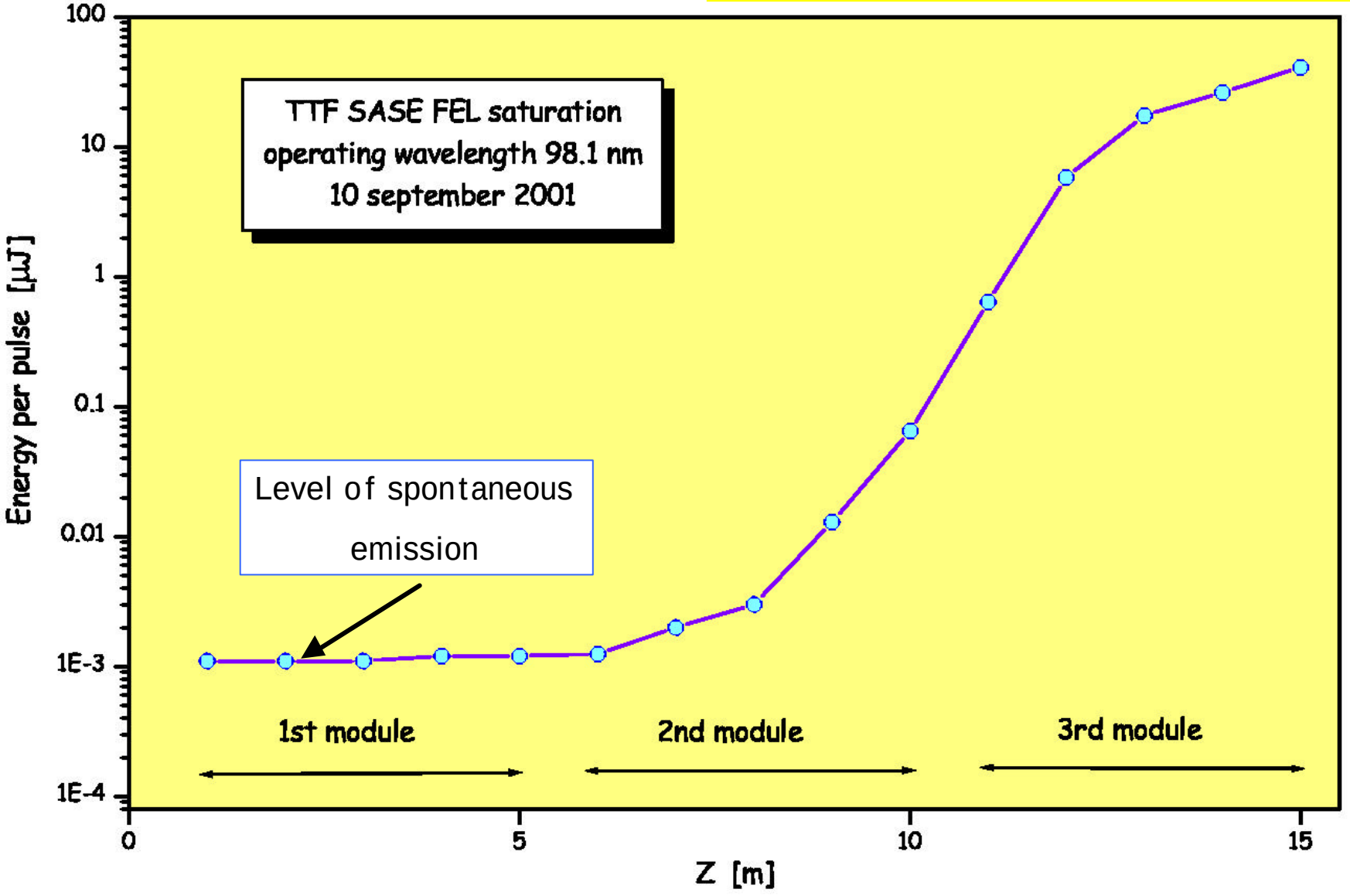
Power: 226 +- 50 MW observed @ 100 nm

200 expected @ 70 nm (1996)

by far the most brilliant VUV light source worldwide

first scientific experiments have started

Saturation


TTF SASE FEL saturation
operating wavelength 98.1 nm
10 september 2001
Level of spontaneous emission
1st module
2nd module
3rd module
Energy per pulse [μJ]
Z [m]
100
10
1
0.1
0.01
1E-3
1E-4
0
5
10
15

Conclusion

The particle physics case is compelling and timely

Unique capabilities and complementary to LHC

X-FEL will provide 0.1 nm light with very high peak brilliance

Many fields of science will greatly benefit

Superconducting technology provides the best experimental conditions and is mature and cost effective

Realisation of TESLA in the framework of an accelerator network makes it a part of the national research programmes

The 1986 Workshop

Title: Radiation Damage to Wire Chambers

Organiser: John Kadyk (LBNL)

1. and last talk:

- When verything was clear (F. Sauli)

.....

- Review of Wire Chamber Aging (J. Va'vra)

Is this time (only?) the order reversed?

No, much has been learned in the past 15 years.

I wish the workshop great success