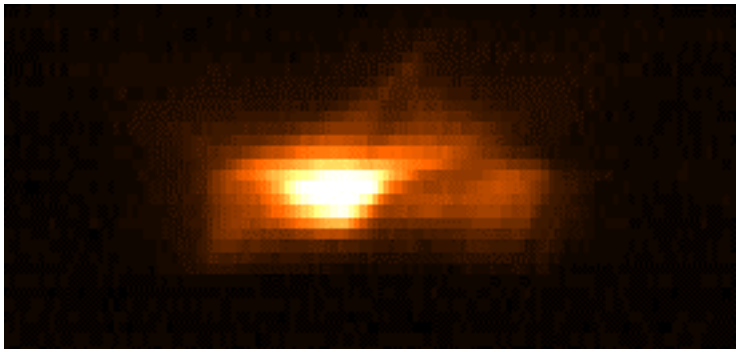
Infrared Beamline at SLS



On December 13 2000, 23:00, for the first time electrons passed the full circumference of the 2.4 GeV SLS Storage Ring

Leonardo Degiorgi

Laboratorium für Festkörperphysik

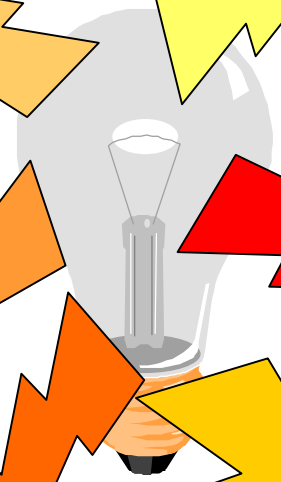
ETH Zürich, Switzerland

ETH Zürich

Motivation

Superconductivity
Energy gap
Symmetry of the order parameter
Strength of coupling

Low-dimensional effects
Dimensionality crossover
Non-Fermi liquid normal states
Broken symmetry ground states



Magnetism
Interplay magnetism
and superconductivity
Itinerant versus localized
moments

Strongly correlated electrons
Kondo problem
Heavy electrons

Biophysics
Imaging techniques
Tissues analysis

Chemistry
Material design
Catalysis research

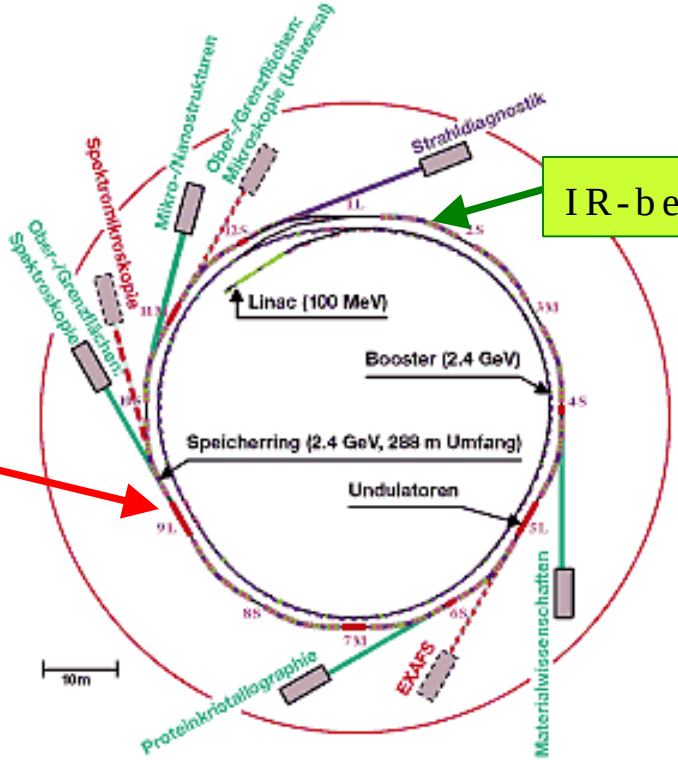
ETH Zürich

What Do We Need?

- **A powerful SR light source:**
  - **Broad band**
  - **High photon flux and collimated beam**
    - High brightness
  - **Small source size**
  - **Highly polarized radiation**

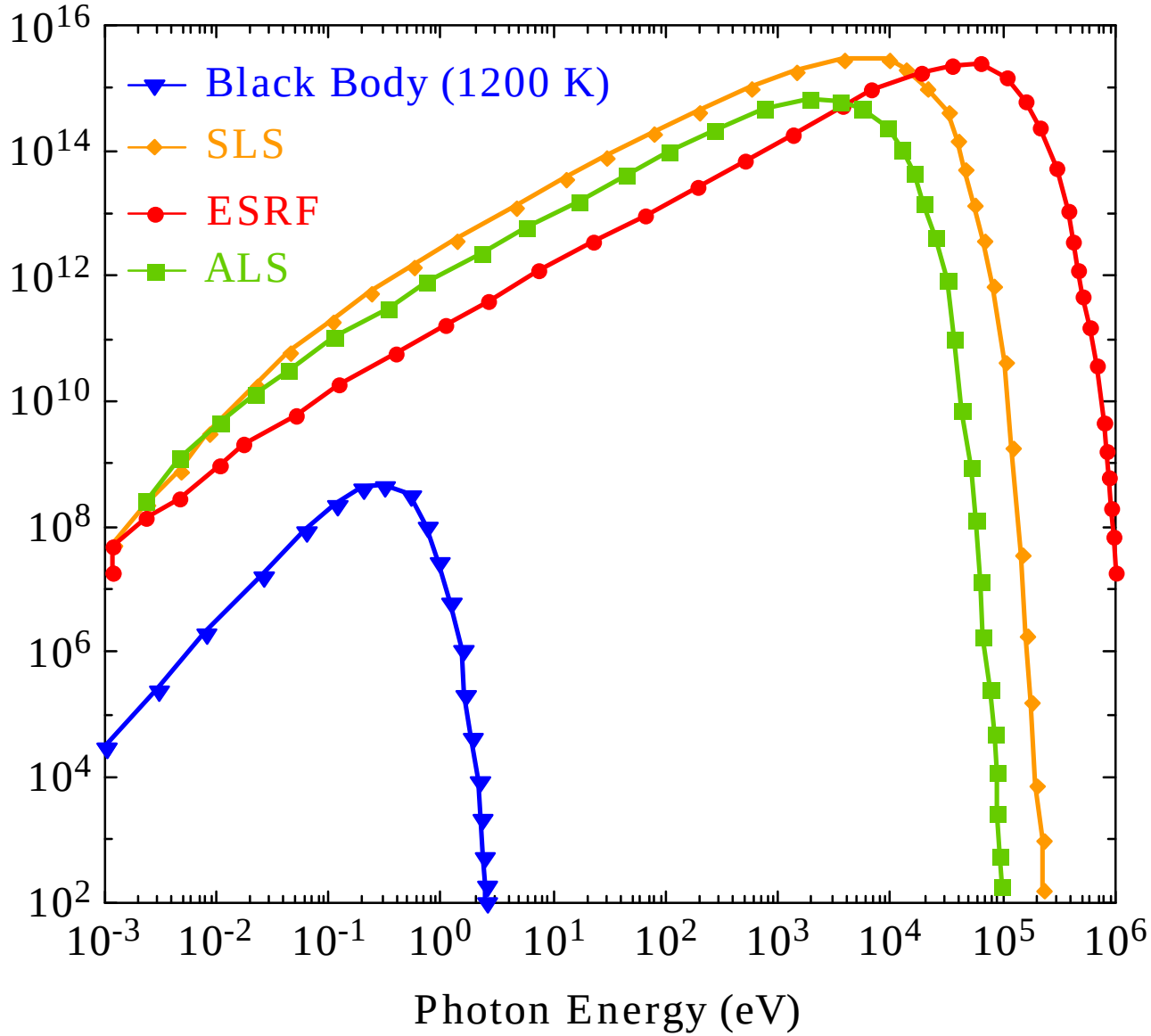
- **Exploit a wealth of experimental techniques:**
  - **IR-spectroscopy (as a function of temperature, magnetic field and pressure)**
  - **IR-microscopy (with diffraction limited resolution)**
  - **IR-ellipsometry**
  - **UV-tunable source for Raman spectroscopy**
  - **Time-resolved spectroscopy**

A Vision for the Future: an IR-Beamline at SLS



ETH Zürich

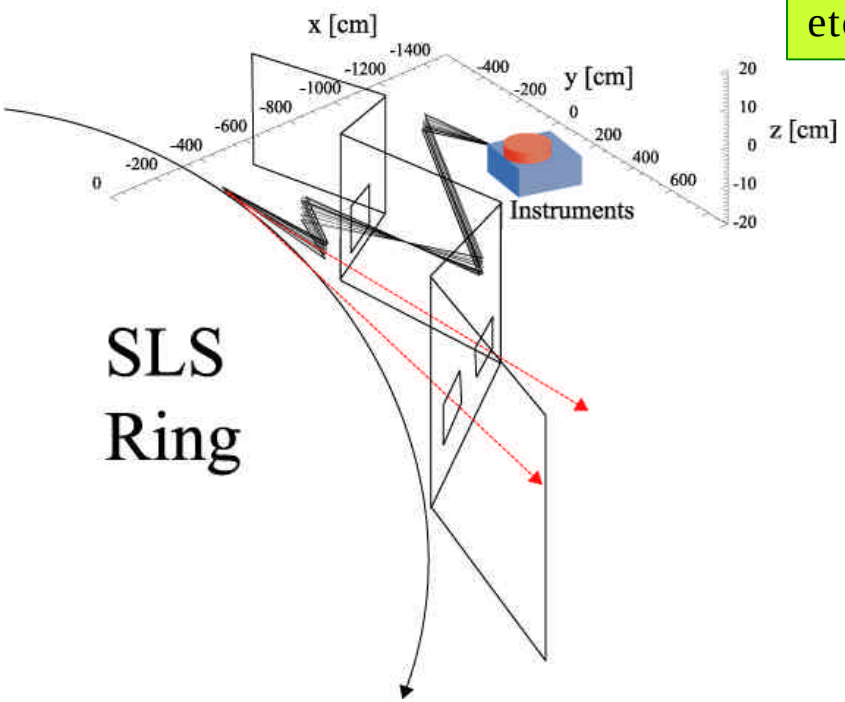
SLS Brilliance

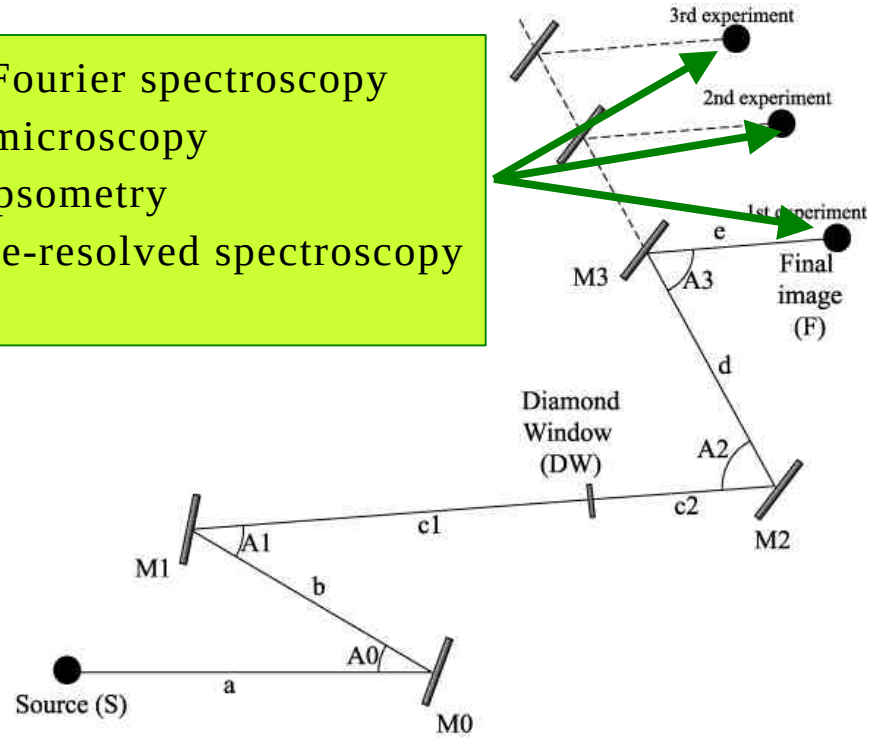


ETH Zürich

Schematic Layout of the IR-Beamline at SLS

IR-Fourier spectroscopy
IR-microscopy
Ellipsometry
Time-resolved spectroscopy
etc.





M0=plane mirror
M1=elliptical mirror/
magic mirror
M2=toroidal mirror
M3=toroidal mirror

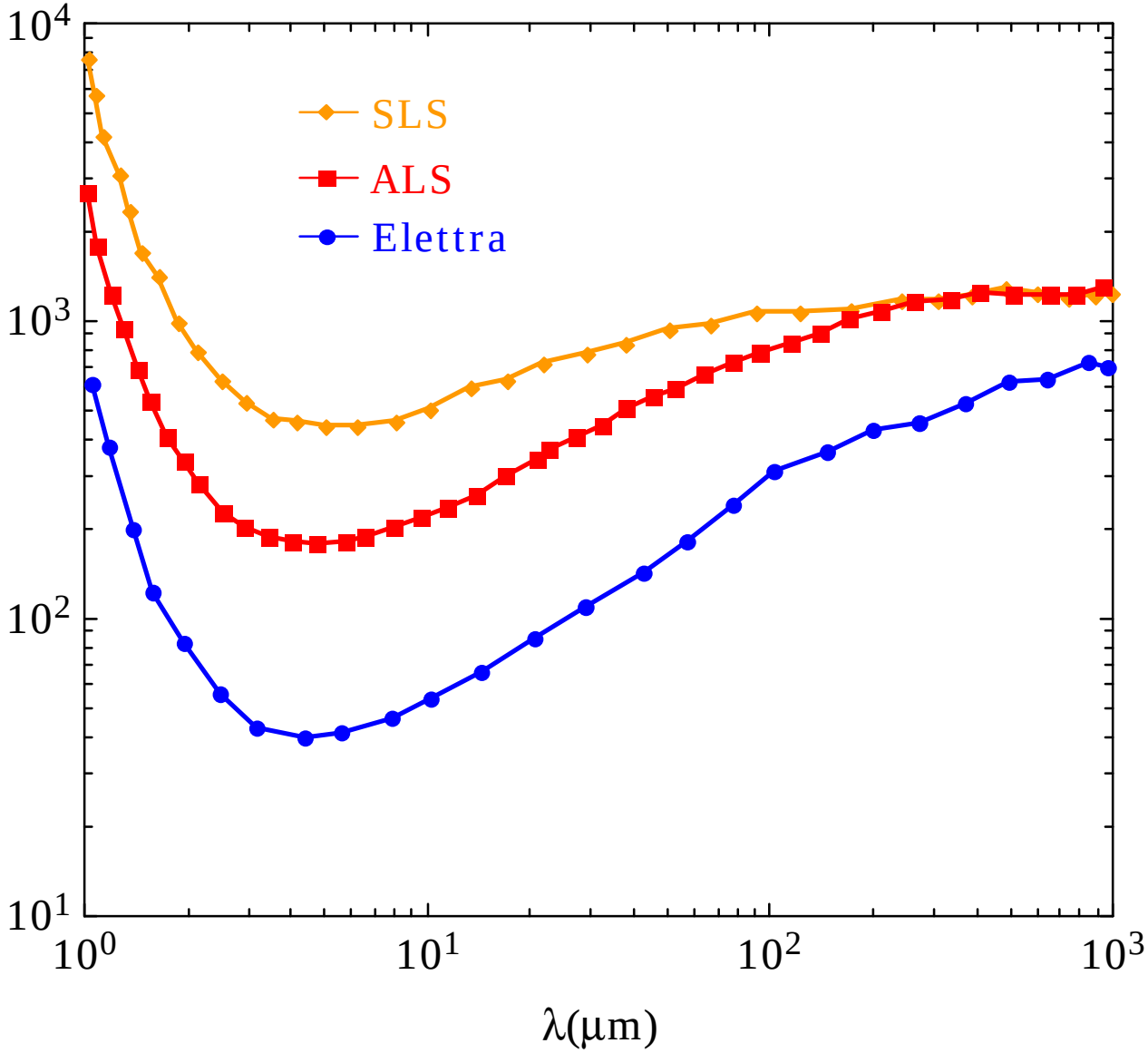
Angles:

A0=25∞
A1=36.65∞
A2=45∞
A3=45∞

Magnification ratio=1	Magnification ratio=0.5
Distances:	Distances:
a=550 cm	a=550 cm
b=300 cm	b=300 cm
c1=860 cm	c1=430 cm
c2=500 cm	c2=300 cm
d=arbitrary	d=arbitrary
e=500 cm	e=300 cm

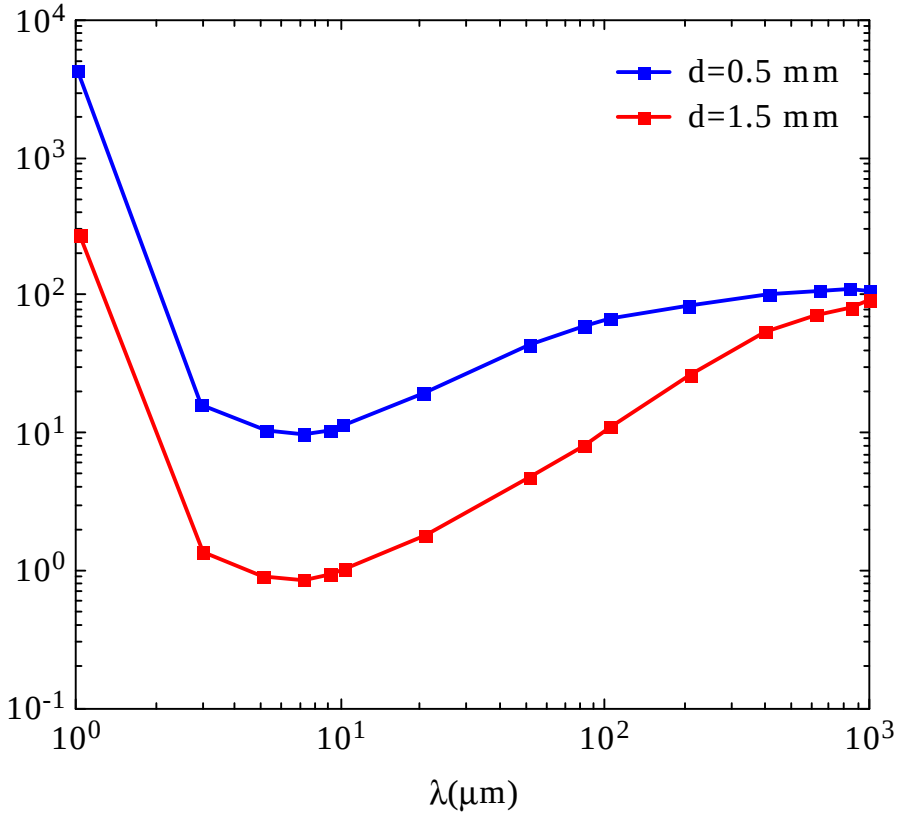
ETH Zürich

ABR at the Source Spot

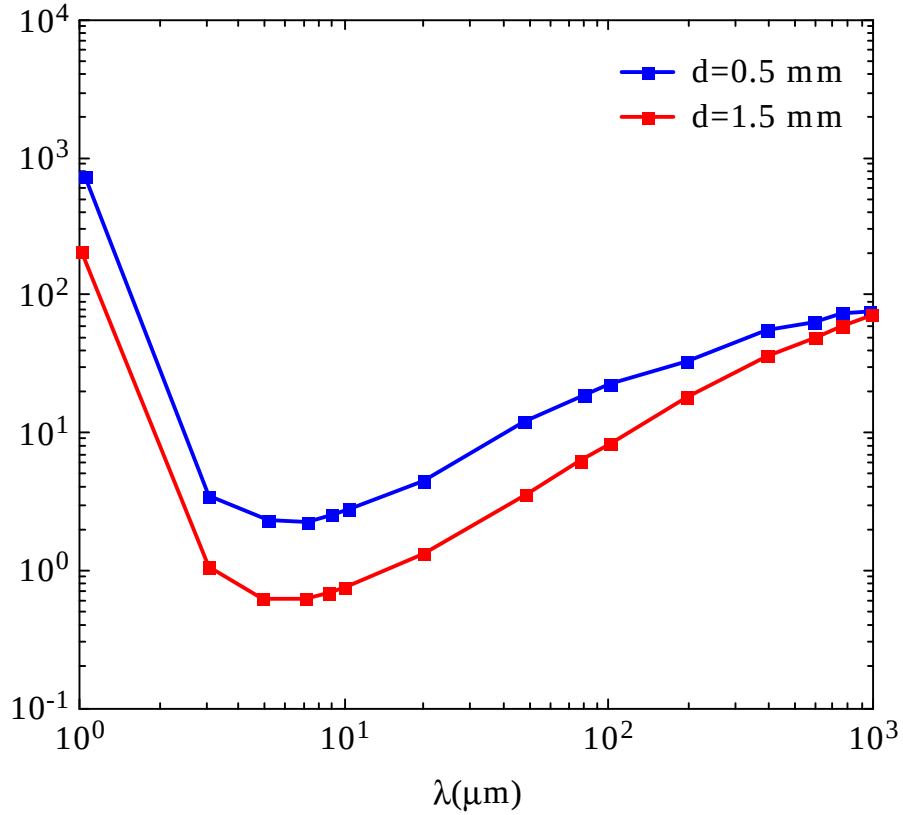


ETH Zürich

ABR at the Sample Position



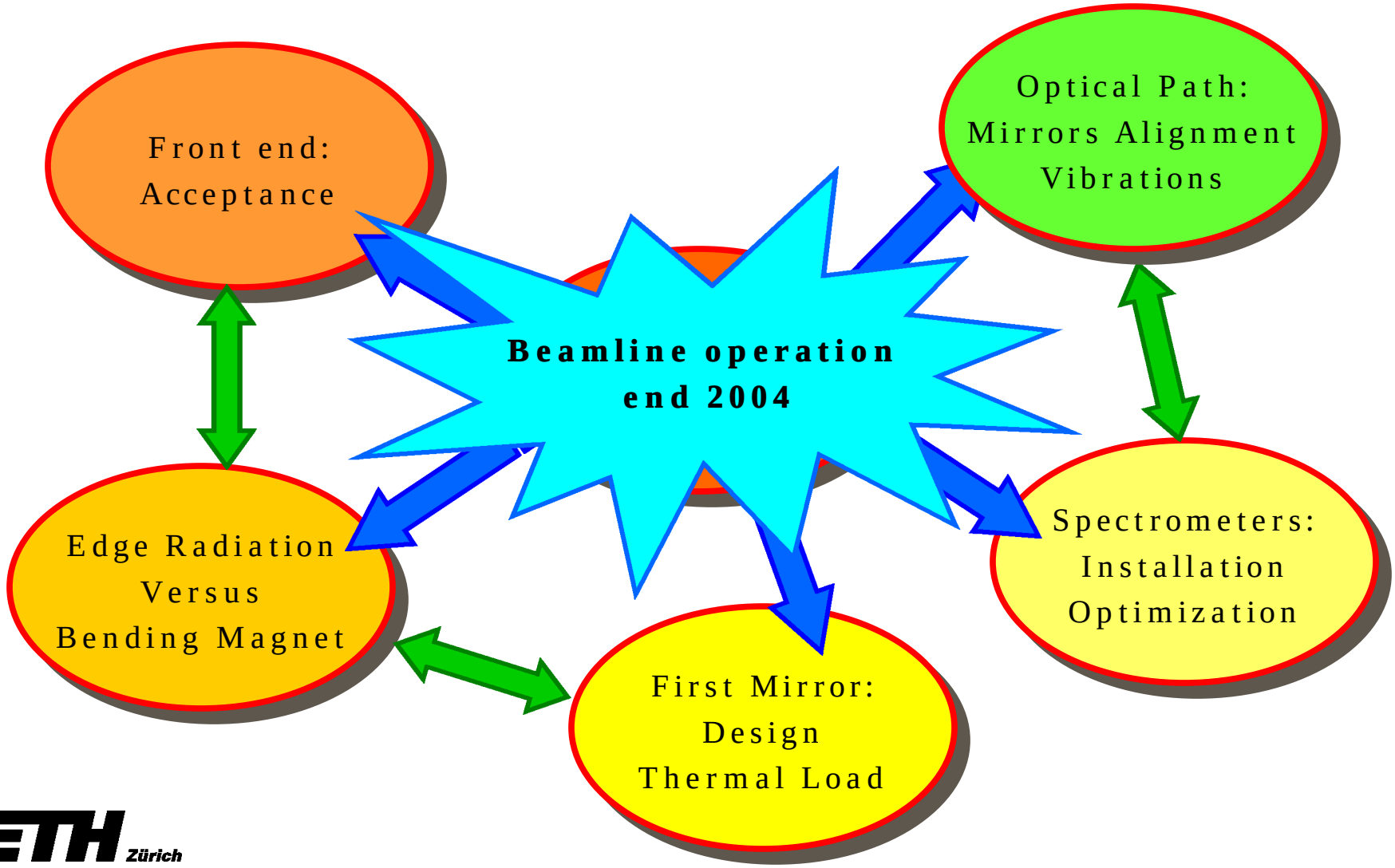
Ideal mirrors



Mirrors with waviness and 1 mrad shadow effect on first mirror

ETH Zürich

Beamline Development



ETH Zürich

Acknowledgements

The most important person:
Daniele Cannavo' (PSI/ETH)

- P. Calvani
- L. Carr
- P. Dumas
- S. Kimura
- C. Marcelli
- M.C. Martin
- Y.-L. Mathis
- G. Zachmann
- G. Williams

- R. Abela
- S. Ming
- C. Qianhong
- J. Wambach
- H.R. Ott
- F. van der Veen

- Financial support by ETH/PSI

ETH Zürich

Thank You for Your Attention

SLS News

http://www.solidphys.ethz.ch/spectro/

ETH Zürich