A Light for Science

WELKOM bij de ESRF

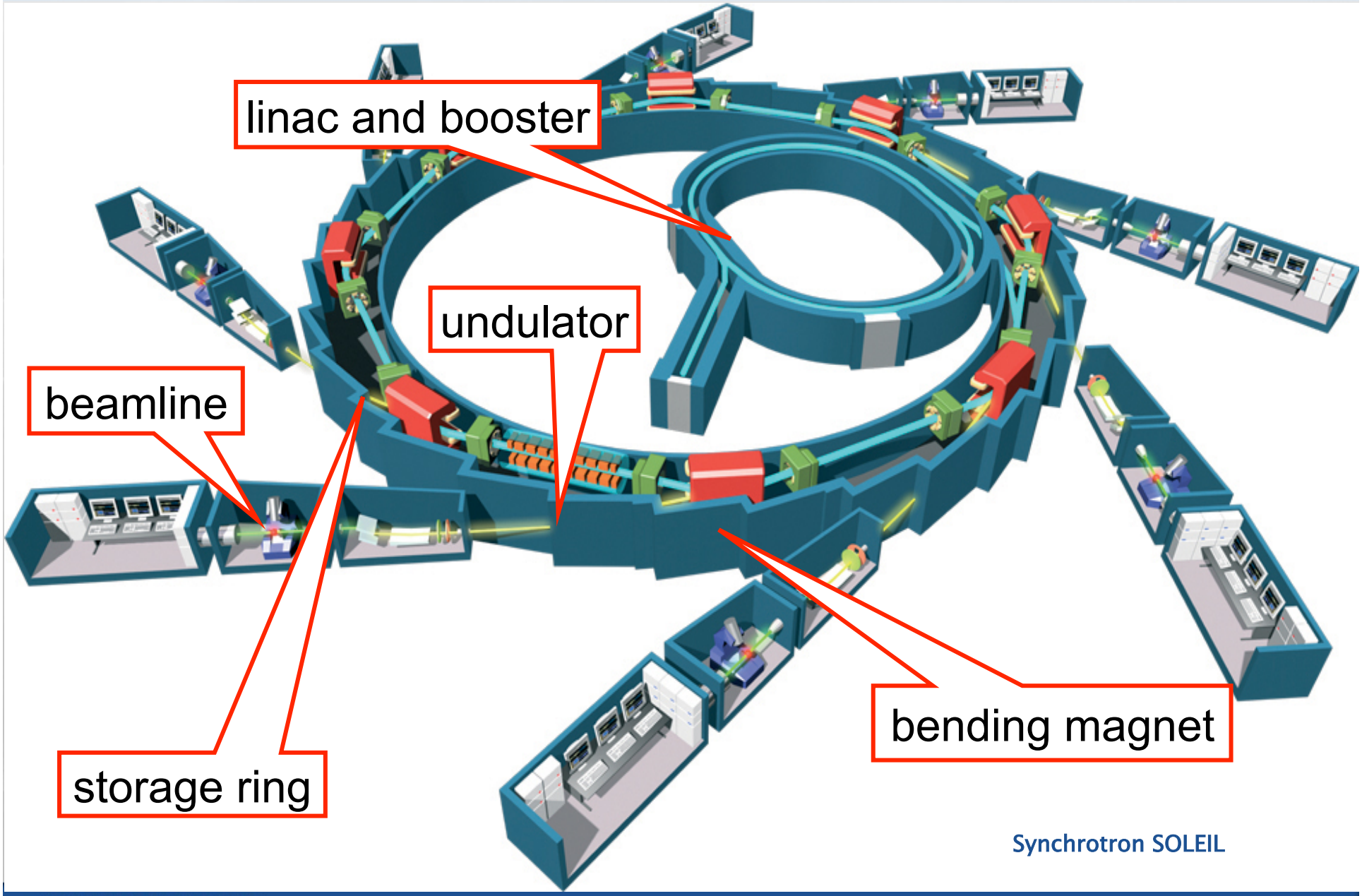
De ESRF, een 3e generatie synchrotron

Wat is het en wat kun je er mee?

Bauke Dijkstra (directeur onderzoek ESRF)

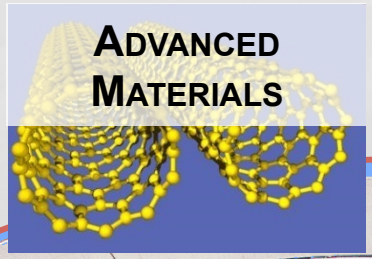
Wim Bras (projectleider DUBBLE)

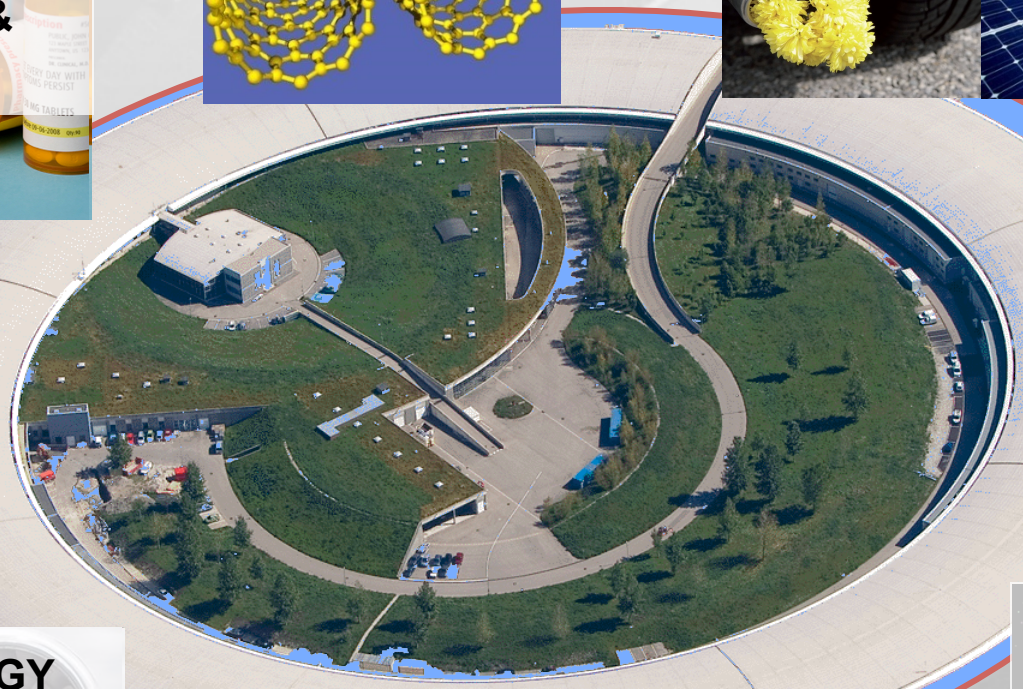
- A synchrotron is a facility where electrons are accelerated around a fixed circular path by an electric field and held to the path by an increasing magnetic field
- To keep the electrons in the circular path energy is required
- The electrons emit this energy again in the form of X-ray radiation
- The ESRF is thus a huge X-ray generator

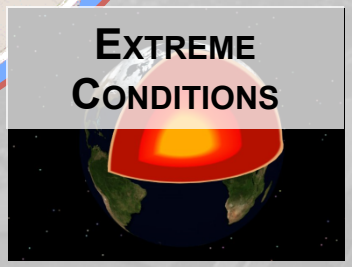


Synchrotron SOLEIL

A versatile tool: from X-rays to applications







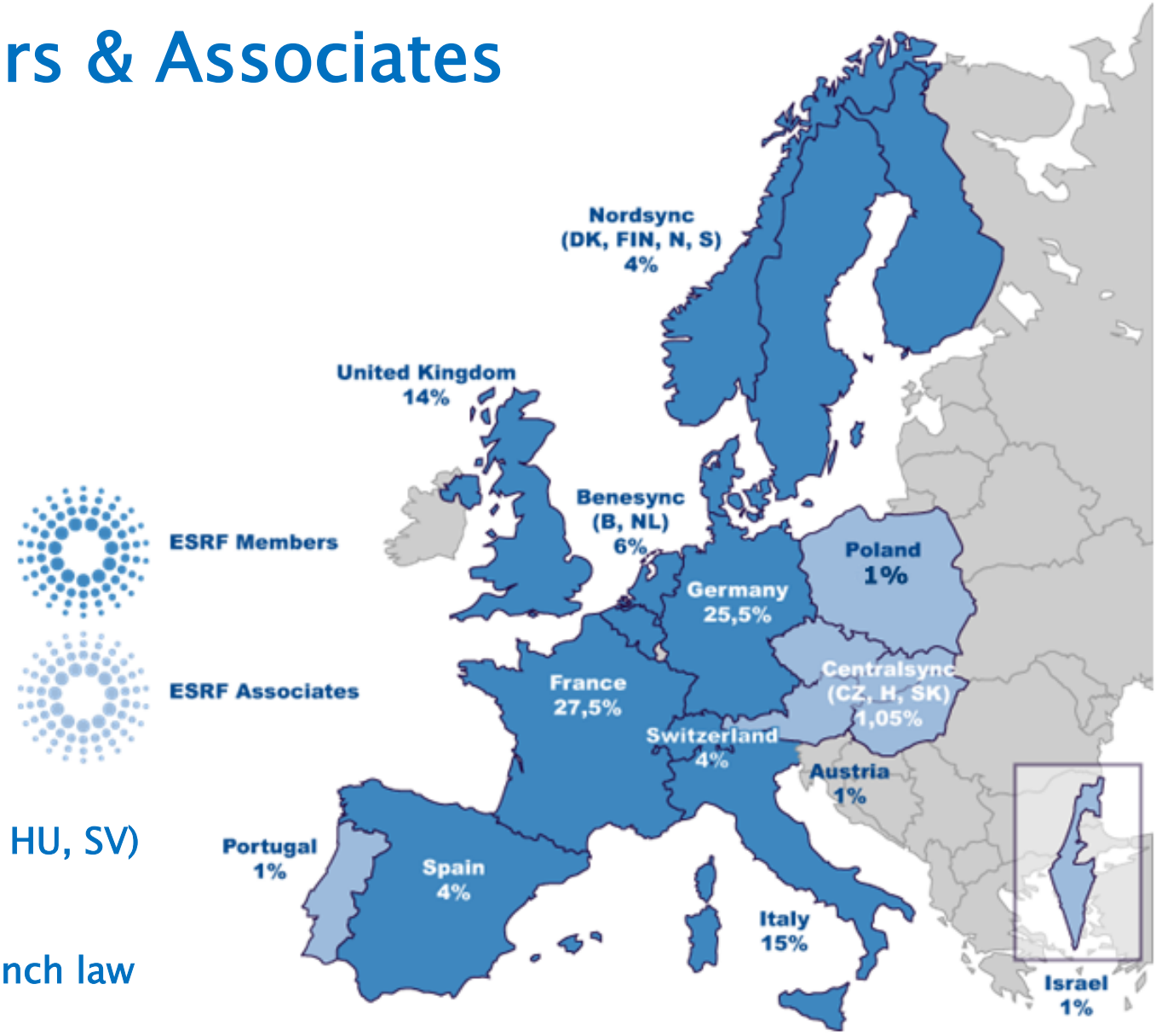
ESRF Members & Associates

27.5% France
25.5% Germany
15% Italy
14% United Kingdom

4% Spain
4% Switzerland
6% Benesync
(BE, NL)
4% Nordsync
(DK, SF, NO, SE)

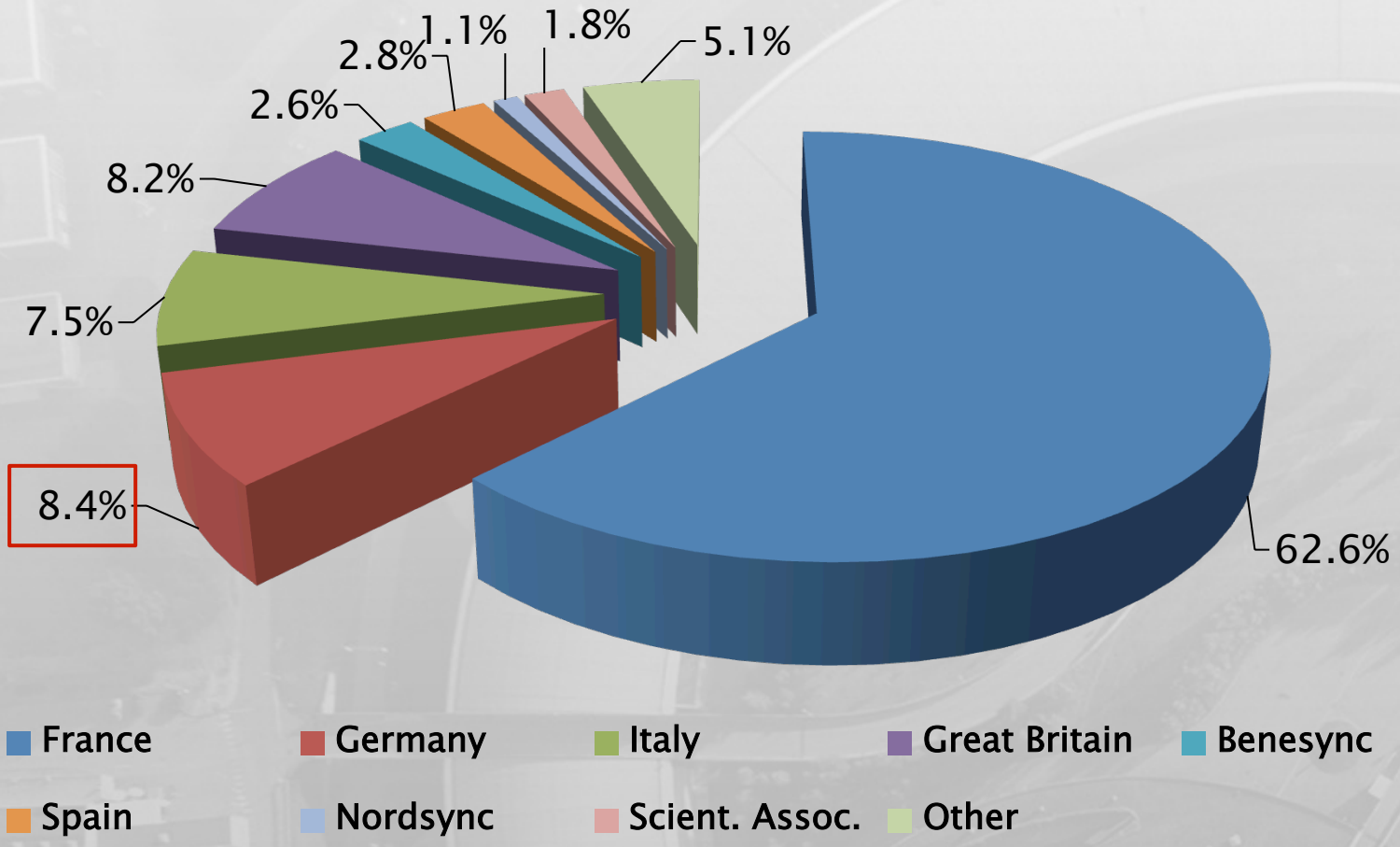
1% Portugal
1% Israel
1% Austria
1% Poland
1.05% Centralsync (CZ, HU, SV)

0.3% South Africa
Société civile under French law
Budget 100 Mio Euros



ESRF Staff on 31-12-2012

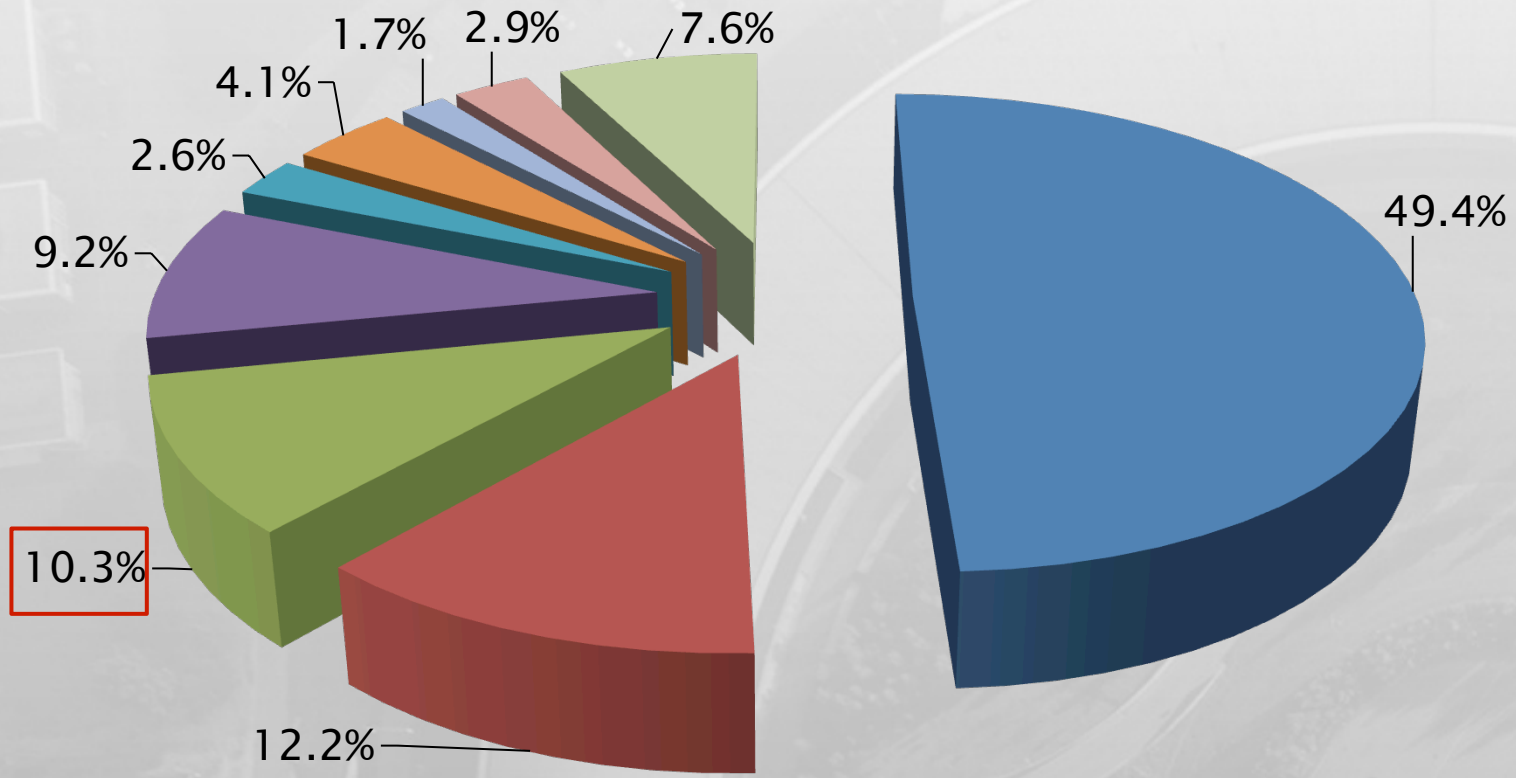
Distribution by nationality (~600 Staff)



Employees counted by post

ESRF Staff on 31-12-2012

Distribution of Scientists(~160), Engineers(~180) and Senior Administrators (~20) by nationality



Employees counted by post

User Facility

11,000 PIs between 2009 and 2012

1900 publications per year

Facility cost of 50 k€/publication

Scientific Excellence

30 Nature and Science papers in 2011

4 Nobel Prize winners among users

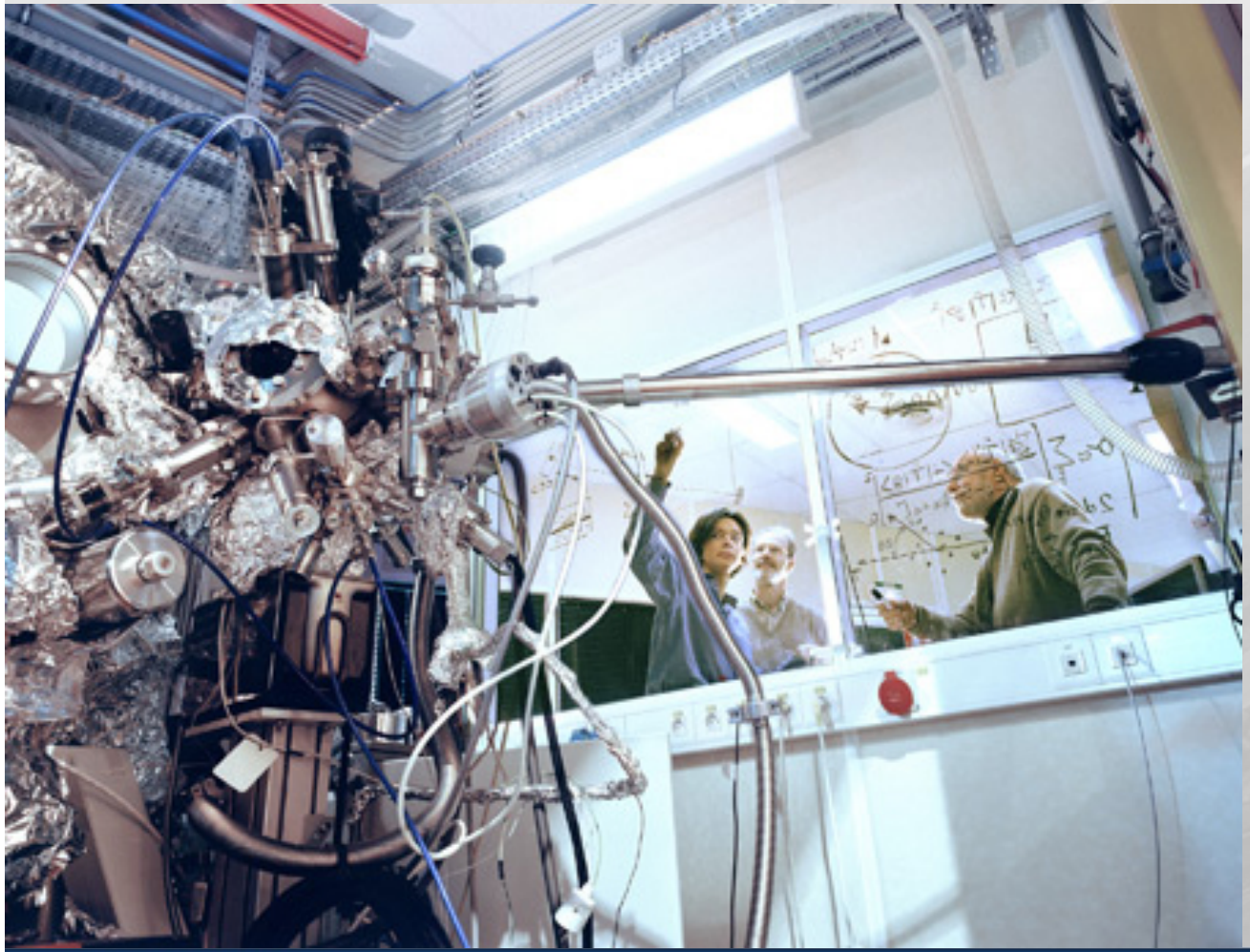
Societal Impact

~25% of capacity for industry R&D

Materials, energy, health → main topics

Training students at a world class facility

The role model for a User Facility



2000 proposals per year evaluated by 10 external panels.

Beamtime allocation within 6-9 months.

24h/24h availability of ESRF scientists as local contacts.

Travel cost to Grenoble paid by the ESRF.

200-room hostel and restaurant on site.

Main challenges ahead:

- Maintain global leadership of the ESRF (and Europe)
- Drive the European strategy in photon science
- Implement a scientific vision for 2020 and beyond

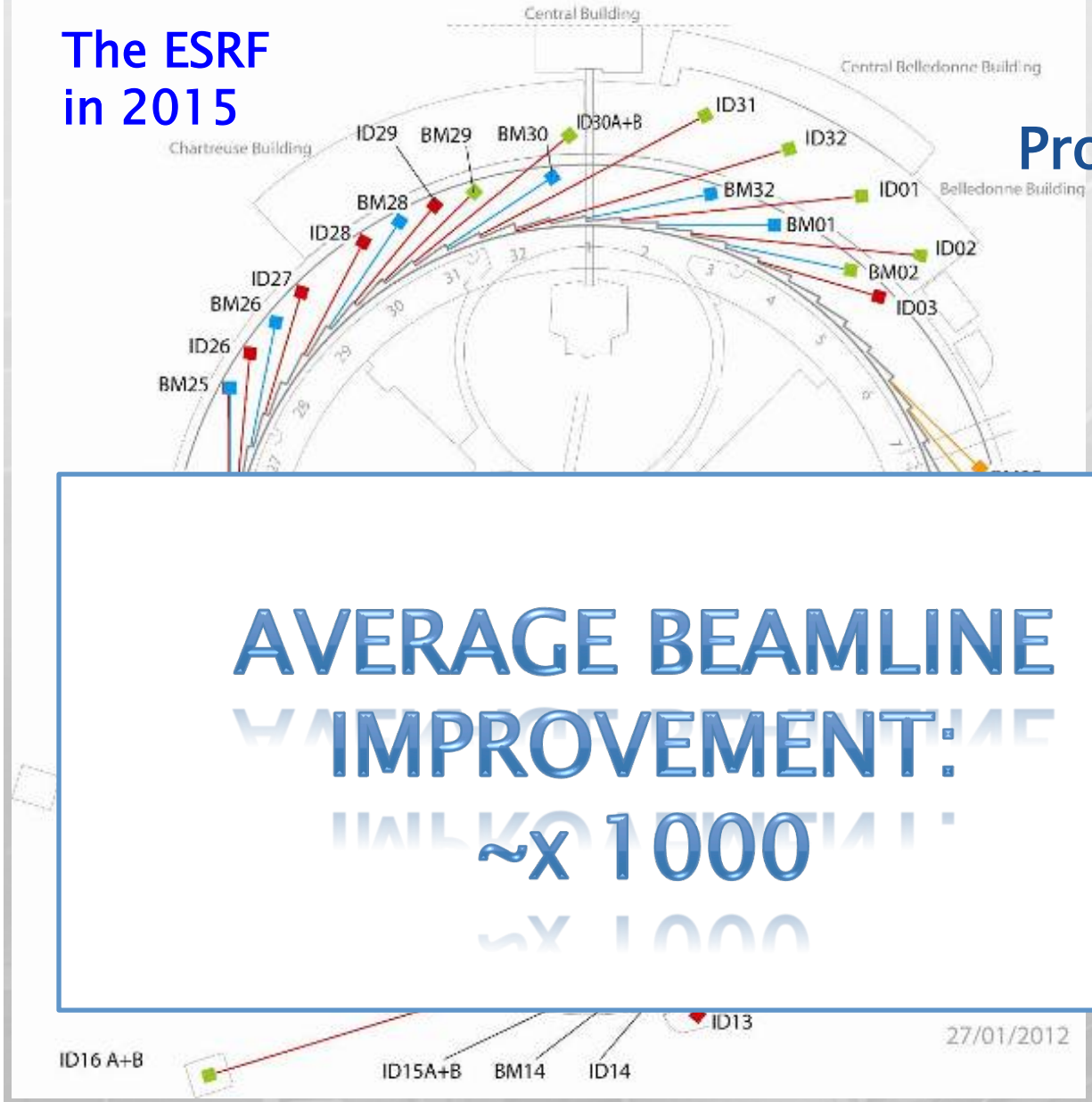
ESRF Upgrade Programme

Phase I (2009–2015): well advanced

Phase II (2015–2019): proposal in preparation

- Accelerator and source
- Beamlines
- Enabling technologies

The ESRF in 2015



ESRF Upgrade Programme 2009–2015

Eight new beamlines all unique worldwide

Many existing beamlines refurbished to world-leading performance

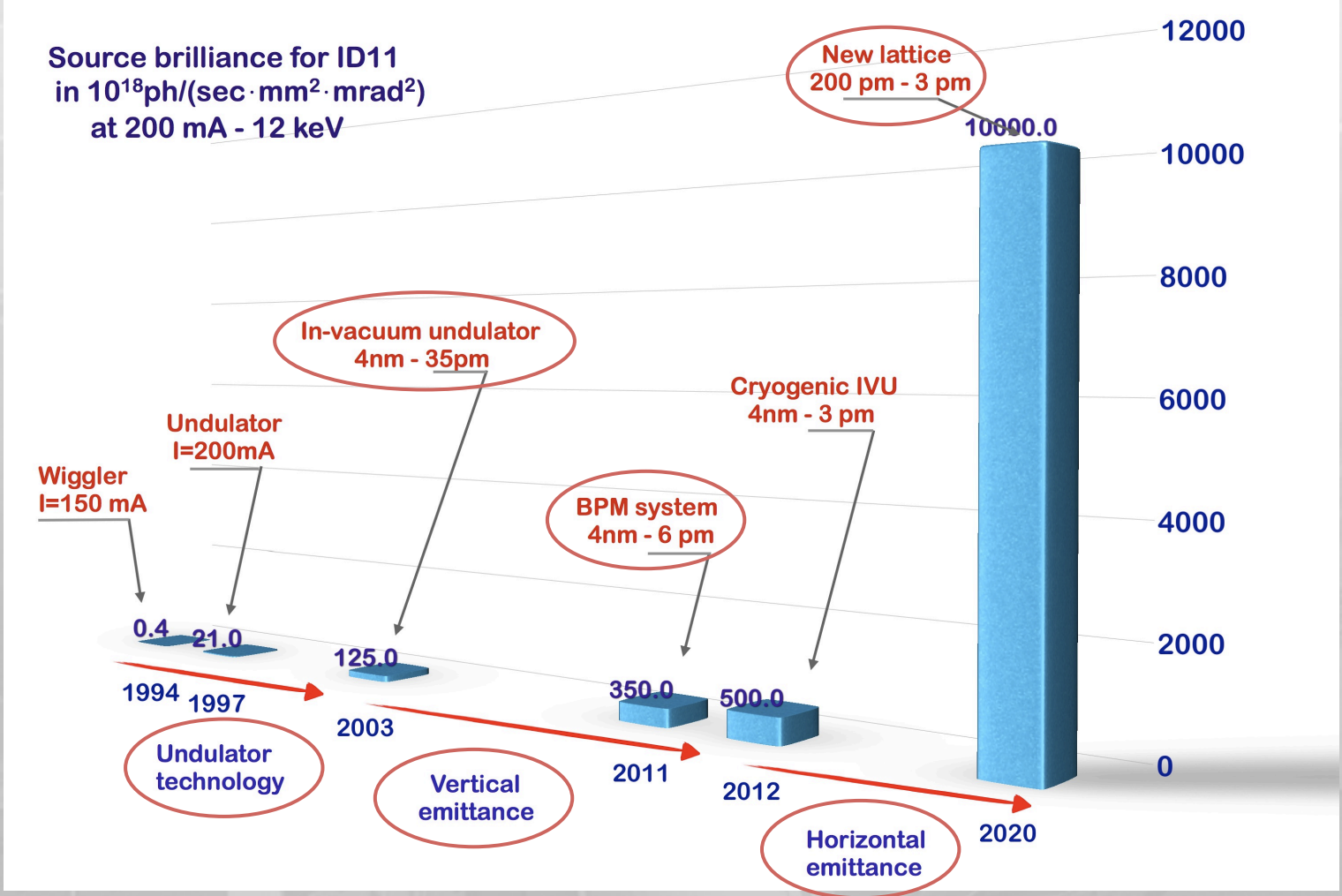
AVERAGE BEAMLINE IMPROVEMENT: ~x 1000

ESRF Upgrade Programme
Phase I (2009–2015): well advanced
Phase II (2015–2019): proposal in preparation

Replace the existing electron storage ring with a new one:

150 Mio € new investment will make the ESRF worth a 1000 Mio € facility on a new site, in much less time.

1994 – 2020: three steps towards more brilliance



- All scientific focus areas of the ESRF will benefit from the Phase II Upgrade
- The much improved brilliance of a Phase-2 upgraded source will enable to study materials (e.g. catalysts) in complex or embedded environments (under *in operando* conditions)
- Much smaller, but highly brilliant X-ray beams provide a much improved spatial resolution
- The higher flux will facilitate time-resolved studies
- The much increased coherent photon flux density will be of great benefit for imaging studies of e.g. tumours

Major new projects in photon science

Thank you for your attention!