BESSY

Berliner Elektronenspeicherring-Gesellschaft
für Synchrotronstrahlung m.b.H.

MLS (Metrology Light Source) and the Willy-Wien-Laboratory – Status Report

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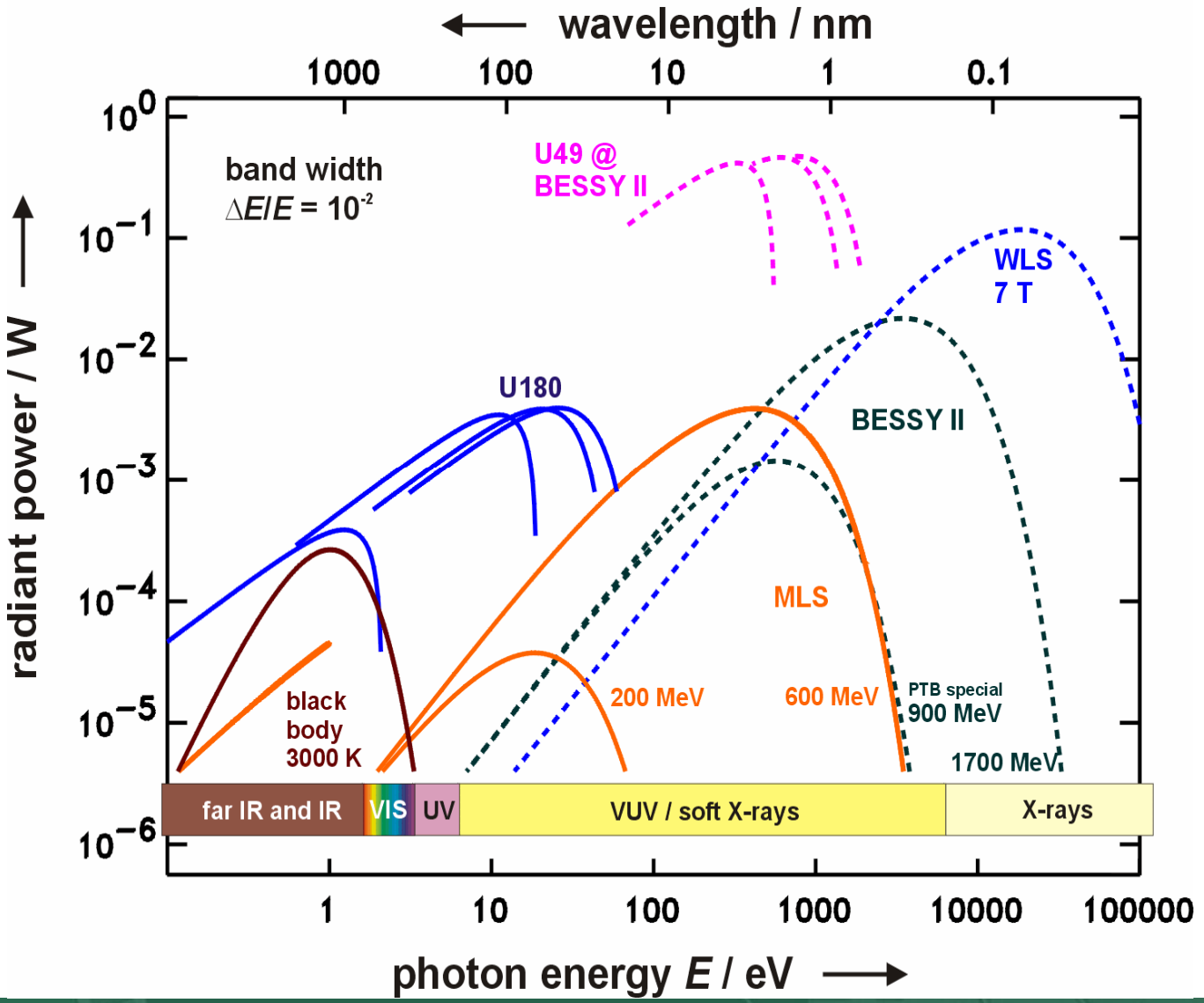
Metrology Light Source: Planning Requirements

- Optimized for the UV and VUV spectral range
- Extending the BESSY II facility at the low energy end of the synchrotron radiation spectrum
- Overlap between BESSY II and MLS in the technologically important EUV range
- Continuous availability of one of the two sources
- Operation of one BESSY II compatible undulator
- IR and THz range available, coherent SR an option
- Used as a primary radiation standard
- Variable electron energy (200 MeV to 600 MeV) and variable current (1 electron to 200 mA)
- Stable and reproducible beam conditions

Spectral Ranges of MLS and BESSY II



The Willy-Wien-Laboratory

Under construction at the BESSY II site – right across the street

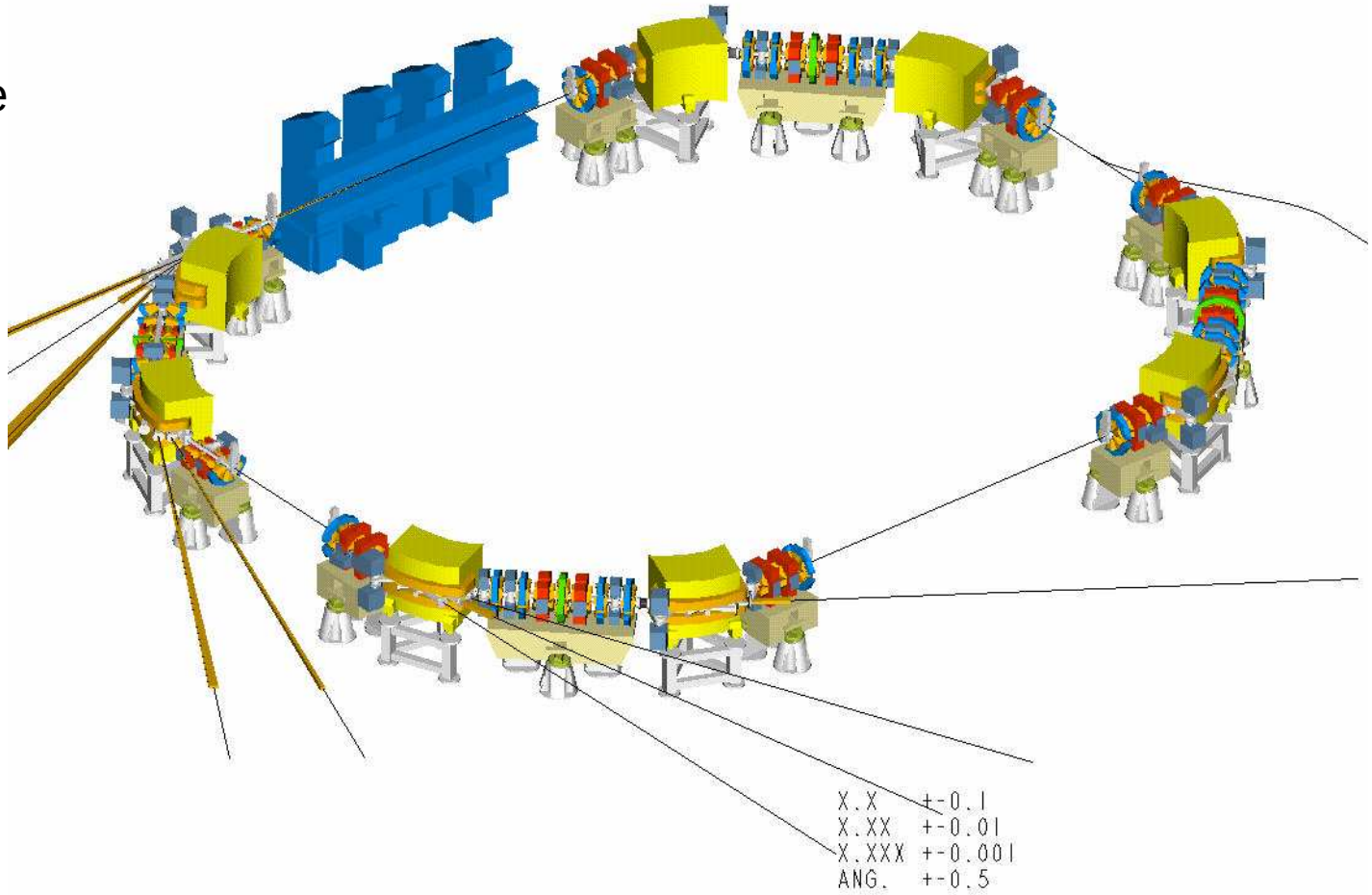
Building construction is finished (inauguration four weeks ago)

User operation scheduled to begin in 2008

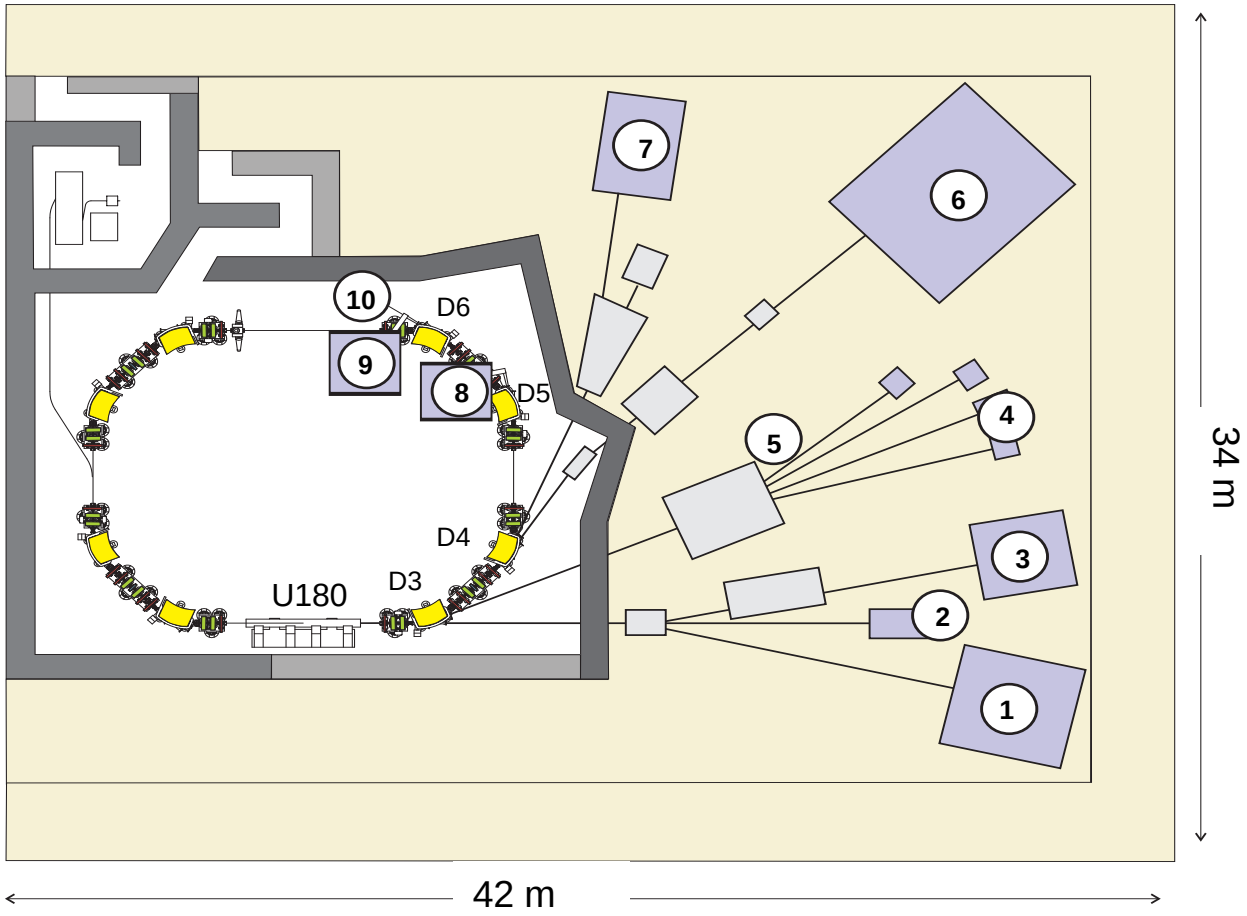
BESSY is a contractor to the PTB for building and operating the MLS

Double bend achromat (4-fold symmetry) with two straight sections (RF and undulator)

Ring is ramped from 100 MeV to end energy (200-600 MeV)



Beamlines at the MLS



1	High-Flux Experiments	6	EUV – Plane Grating Monochromator
2	ID – White Light / Compton-Backscattering Detector	7	UV/VUV – Detector Calibration, Reflectometry
3	UV/VUV Monochromator	8	THz – Beamline
4	Dipole – White Light (Calculable Photon Flux)	9	IR – Beamline
5	UV/VUV Monochromator – Source Calibration	10	Diagnostics Frontend

MLS Control System

Restrictions on manpower enforced a low-effort solution:

- EPICS-based (what a surprise…)
- ~ 10 IOCs: mv2100 (controls) & mv5500 (BPM system) running VxWorks 5.4.2 (moving to RTEMS?)
- ~ 90 PS via CAN bus and i386 controlled AD/DA combo card (24bit set point resolution)
- BPM system (~ 4 mv5500 IOCs) copying the BESSY II technology
- ~ 3 PLCs: RF systems for microtron and ring (external vendors)
- ~ 1 microIOC: vacuum gauges
- ~ 4 soft IOCs on Linux: GPIB through GPIB-Ethernet boxes
- ~ 3 console machines: PC hardware running Linux (Debian)
- Microtron: Danfysik

Current Status – Outside View

Current Status – Inside the Experimental Hall

Current Status – Magnets Waiting to be Installed

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BESSY II – Status Report

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BESSY II – Operation Status

- 2005 budget: 25 M€
- ~ 8,000 shifts at 23 ID beamlines
- ~ 6,000 shifts at 19 dipole beamlines
- New biology laboratory annex
- New helical undulator UE112 replacing a U125
- Pump and probe experiments at the femtosecond laser section with a time resolution of 150 ± 50 fs
- Renewal programme “2007+”: main focus on installing top-up injection mode

Recent FEL project news:

- The Wissenschaftsrat (German Science Council) issued a recommendation: green light from the scientific and technical point of view.
- 3-4 year development phase is funded: Cascading HGHG acceleration.
  Budget is nominally 8.8 M€ – will be ~32 M€ (including staff).