



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

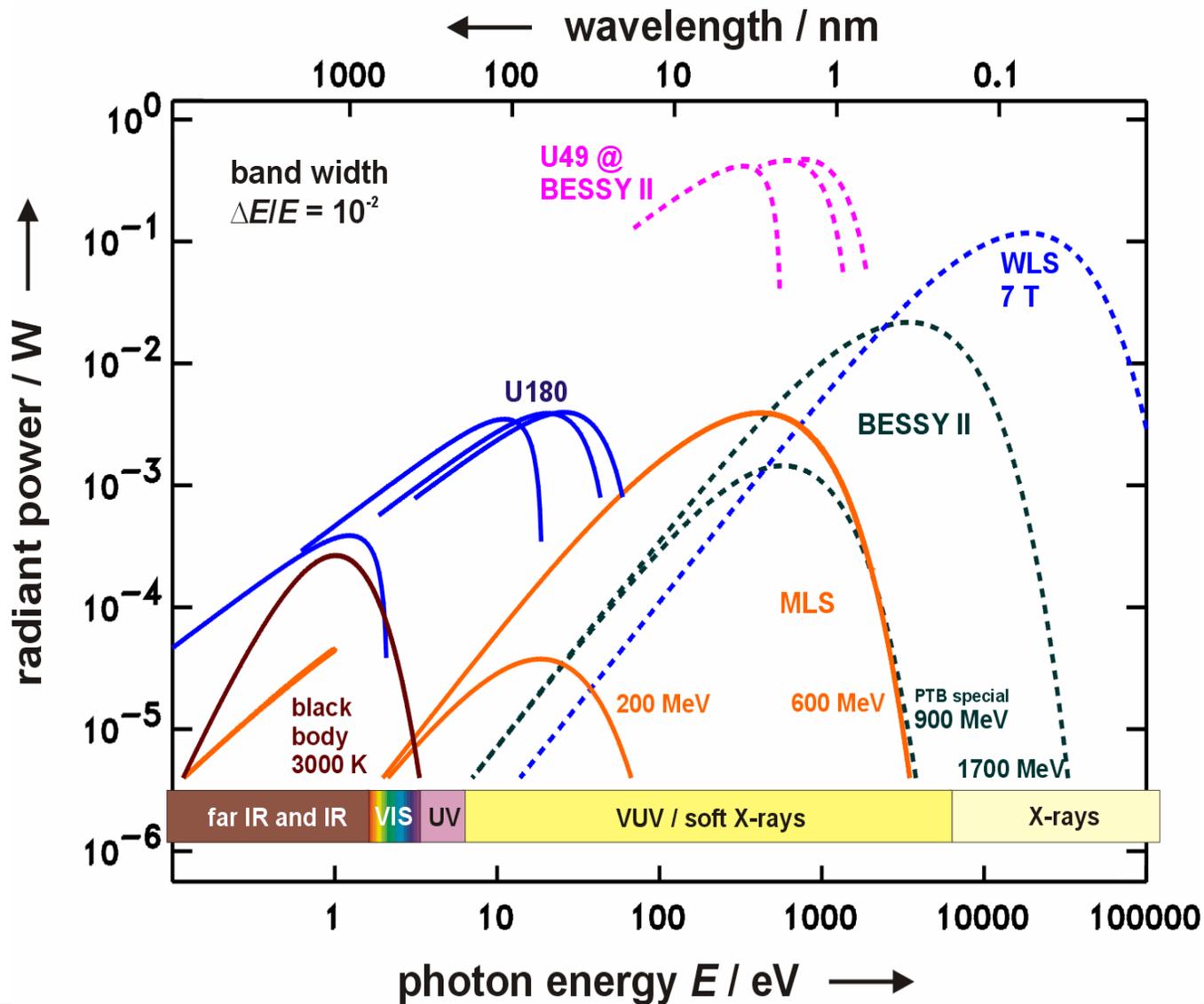
## MLS (Metrology Light Source) Status Report



Ralph Lange (BESSY)

- 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

The logo for PTB (Physikalisch-Technische Bundesanstalt), consisting of the letters "PTB" in a large, bold, blue, sans-serif font.



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

Building construction was finished in May 2006

Commissioning started last week

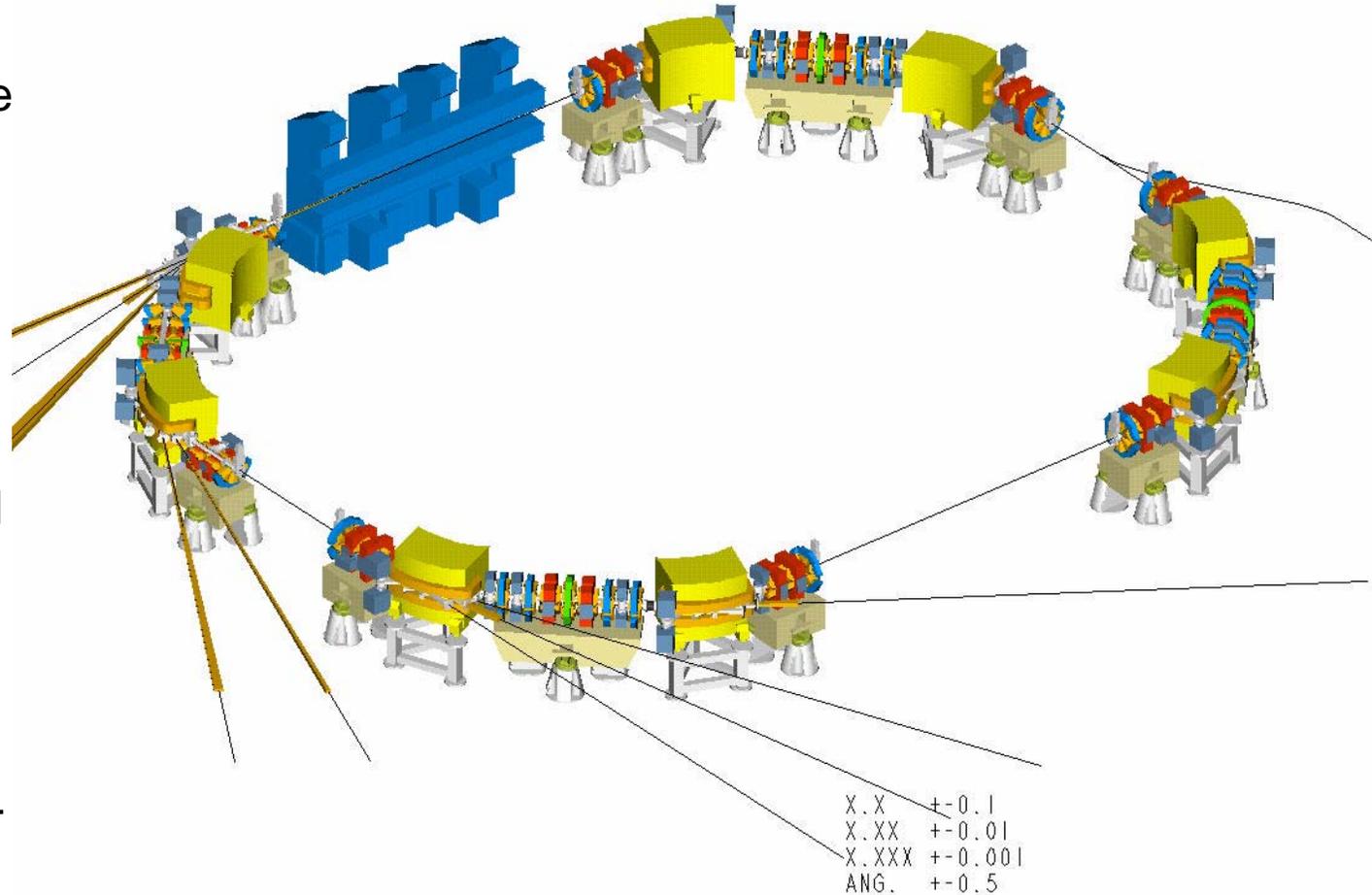
User operation scheduled to begin in 2008

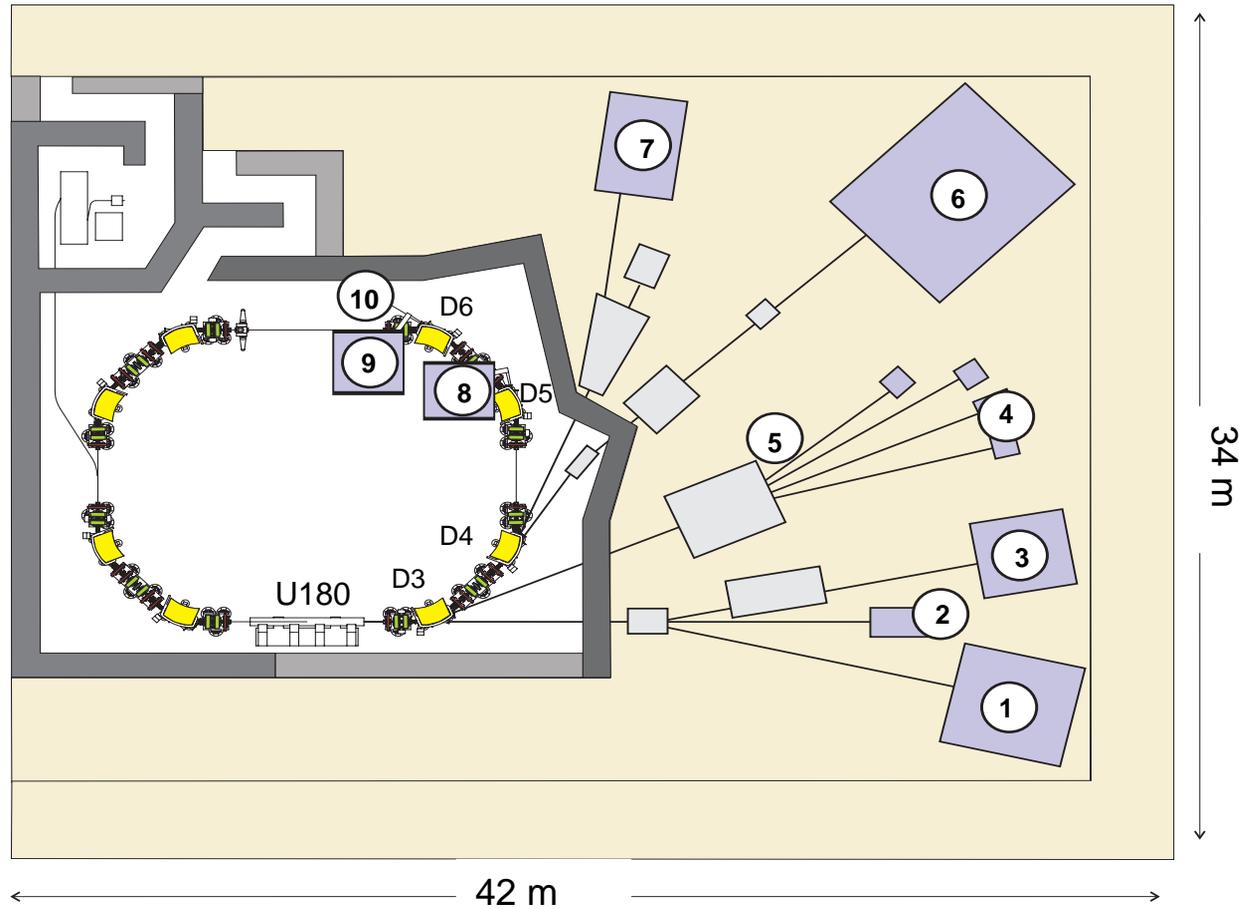


BESSY is a contractor to the PTB for building and operating the MLS

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)





|   |  |    |  |
|---|--|----|--|
| 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                         |

Restrictions on manpower enforced a low-effort solution:

- EPICS-based (surprise, surprise...)
- ~ 8 IOCs: mv2100 (controls) & mv5500 (BPM system) running VxWorks 5.4.2 (moving to RTEMS?) and EPICS Base 3.14(.8.2)
- ~ 90 PS via CAN bus and i386 controlled AD/DA combo card (24bit set point resolution)
- BPM system (~ 4 mv5500 IOCs) utilizing 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)

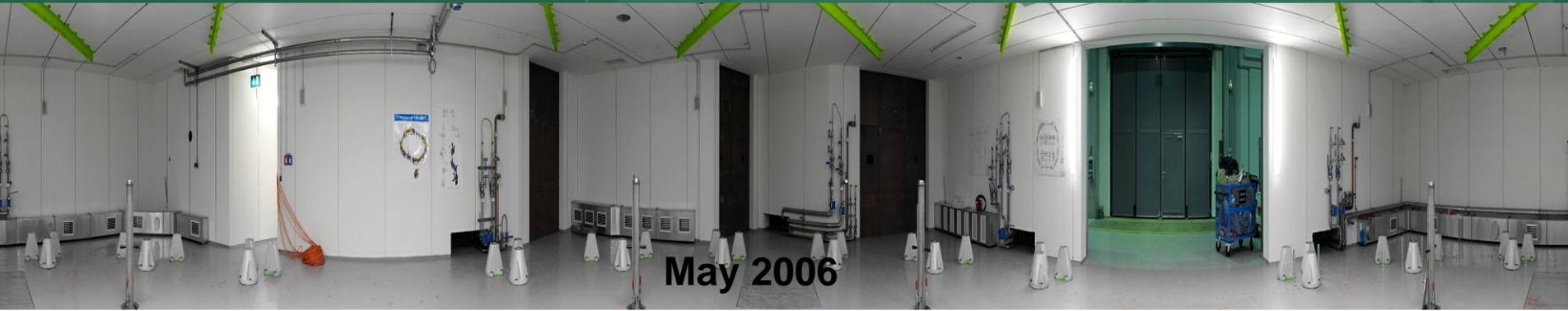
- Starting with a minimized set of hardware (selected the most appropriate animals from the BESSY II zoo)
- The existing naming convention for device names (in front of the colon) was extended by a facility part, a new signal naming convention (after the colon) was introduced: e.g. **PAHMP:fil:rdCur**
- Revision control was moved from CVS to ... not Subversion, but darcs (talk on Thursday morning)
- Moving from dm2k to edm: generic panels were converted
- Distribution system (deployment of databases, binaries, and startup scripts from development to production servers as part of the EPICS iocTop structure) was redesigned:  
The new scripts (based on rsync) keep all distributed sets in the production area while minimizing disk usage, allowing to step back any IOC to any previously distributed file set

|                |   |
|----------------|---|
| Oct 10, 2006   | Delivery of Transfer Line   |
| Nov 1, 2006    | Delivery of Microtron   |
| Nov 15, 2006   | First Vacuum Section ( $\frac{1}{4}$ Storage Ring) installed  |
| Dec 22, 2006   | Preliminary Operation Permit for the Microtron  |
| Jan 3, 2007    | Start of Microtron-Conditioning   |
| Jan 5, 2007    | 2,5 mA @ 100 MeV out of Microtron   |
| Jan 30, 2007   | Last Vacuum Section installed<br>10 mA @ 100 MeV out of Microtron   |
| Feb 20, 2007   | Start of Cavity Conditioning  |
| Feb 23, 2007   | Whole Vacuum System closed  |
| Mar 1, 2007    | Cavity on 45kW Power  |
| April 6, 2007  | All major components are installed and under test.<br>Installation of final diagnostic systems<br>and check of all subsystems |
| April 10, 2007 | Preliminary Operation Permit received   |

|                |  |
|----------------|--|
| April 19, 2007 | 10.30h: Starting to extract from the microtron<br>18.00h: One turn in the storage ring |
| April 20, 2007 | Two turns (RF still off)   |
| Tomorrow       | First stored beam??  |
| Jan 2, 2008    | Planned start of user operation  |





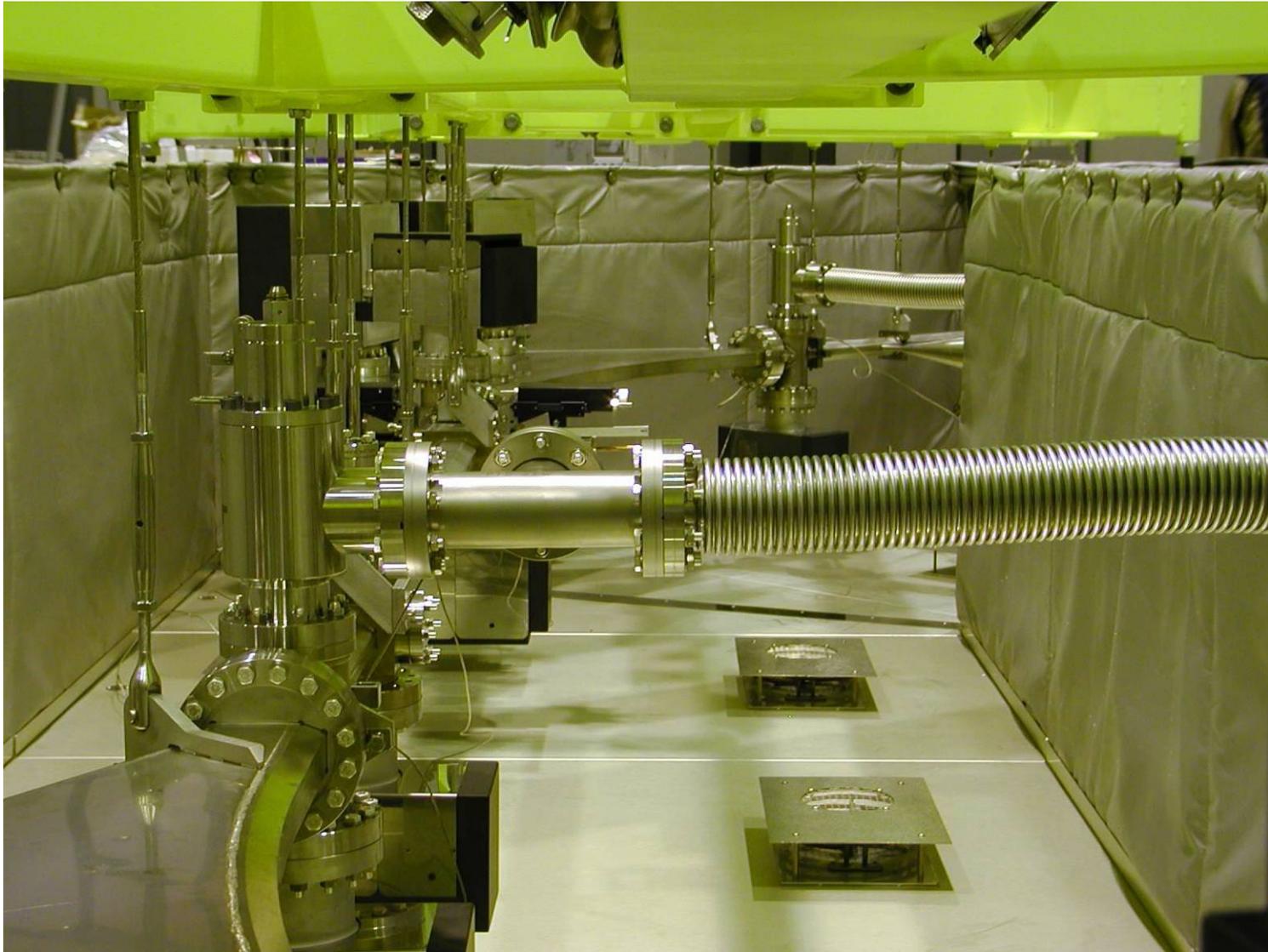


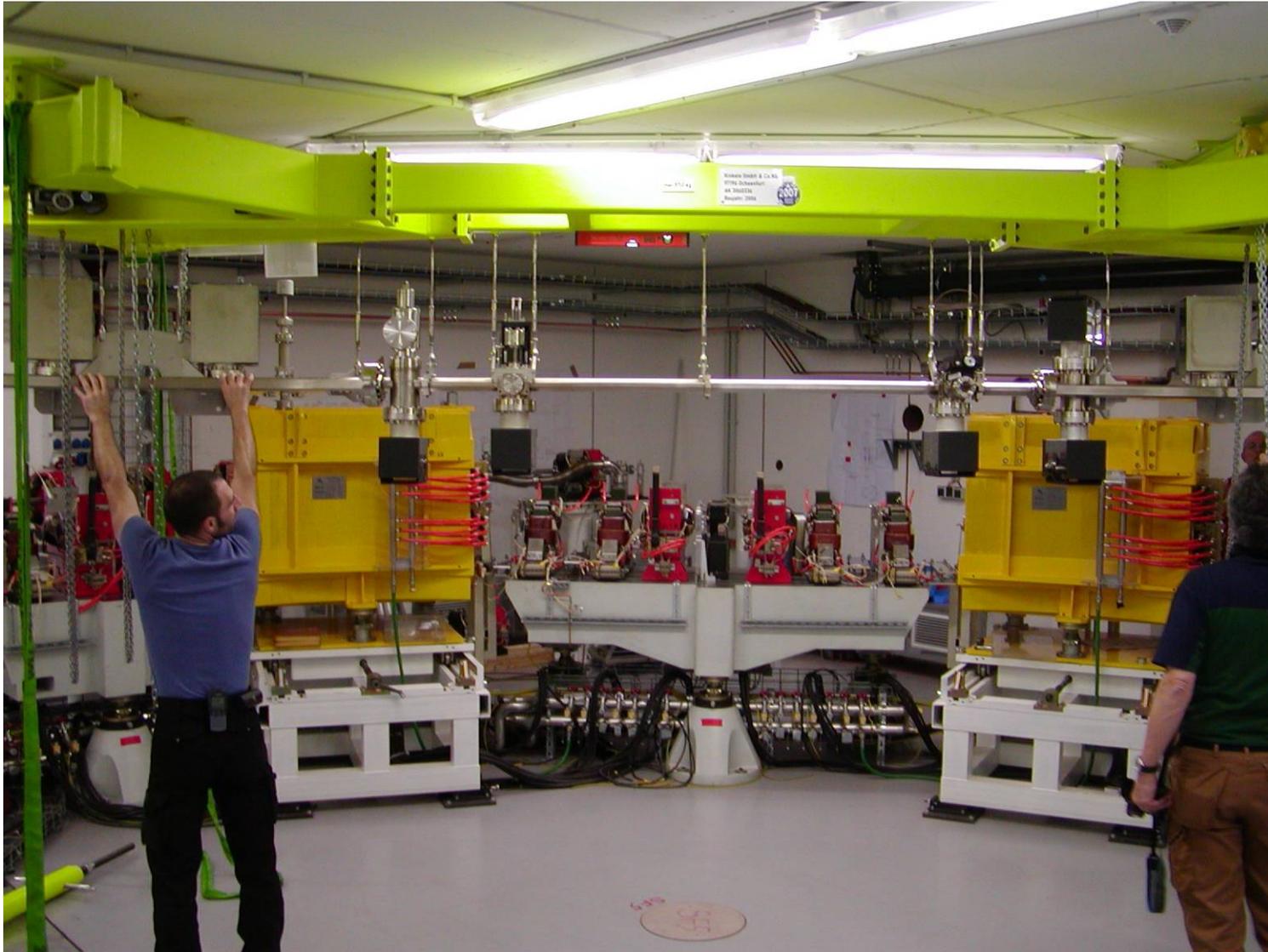


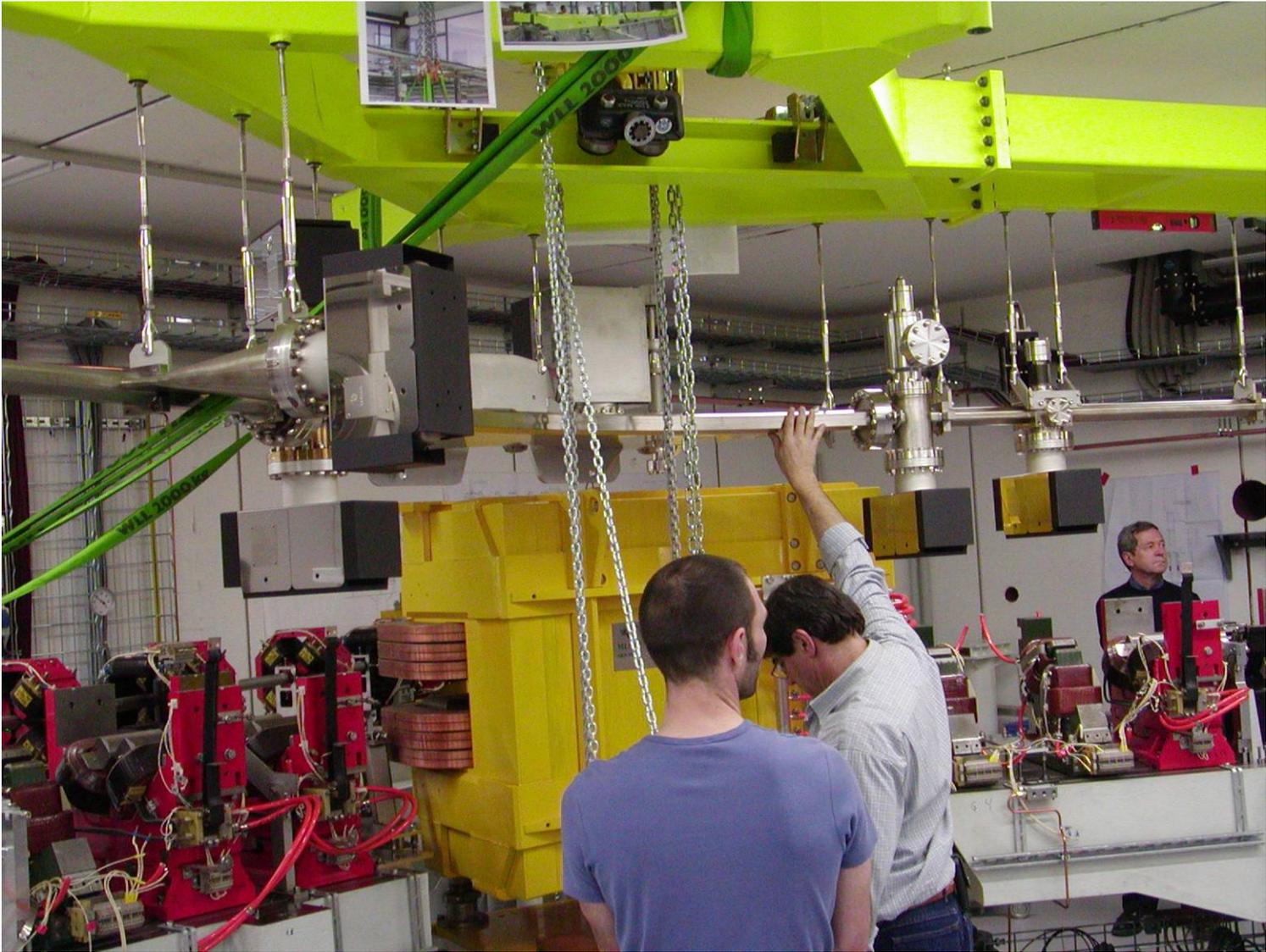
**21.Sept. 2006**



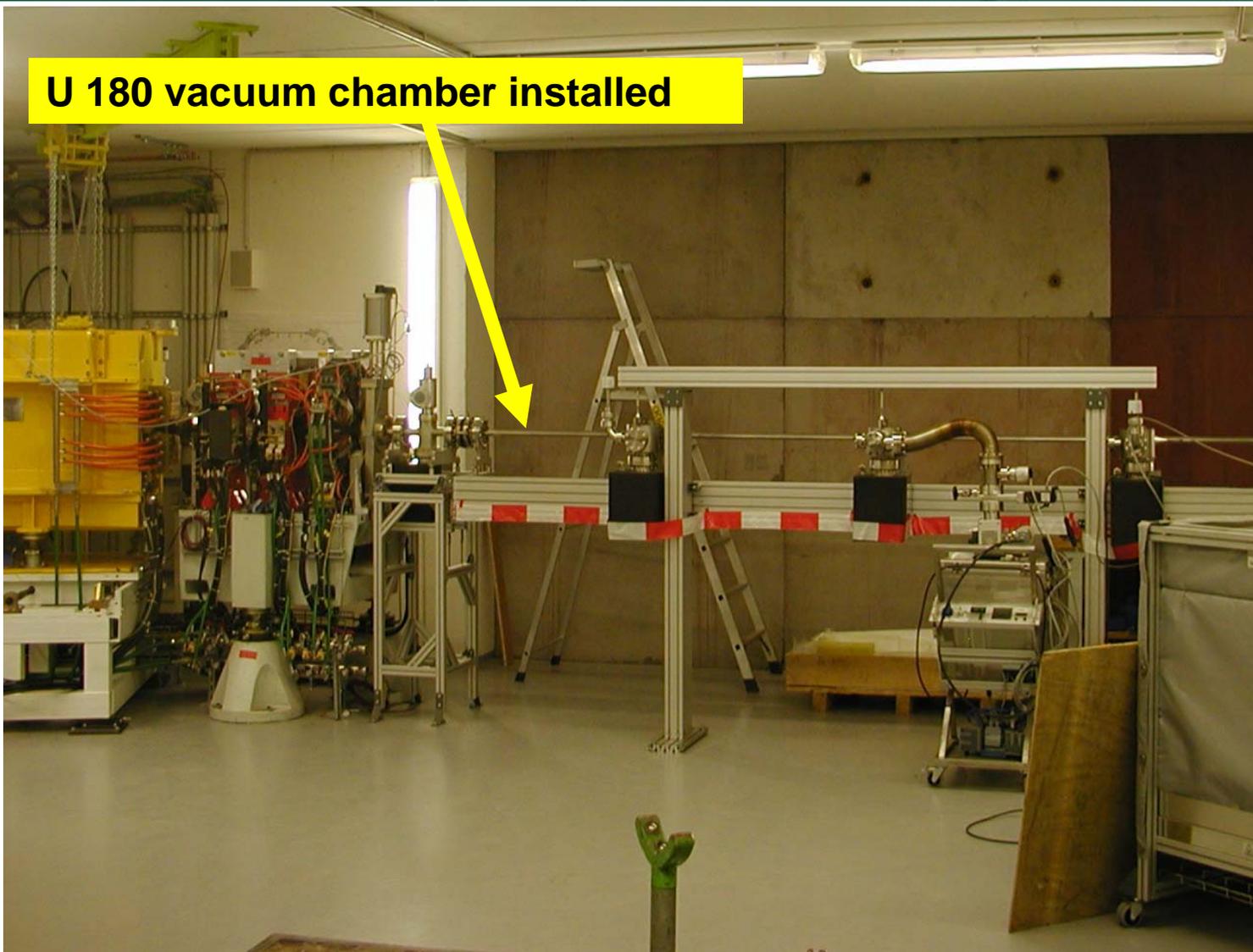
**27.Sept. 2006**

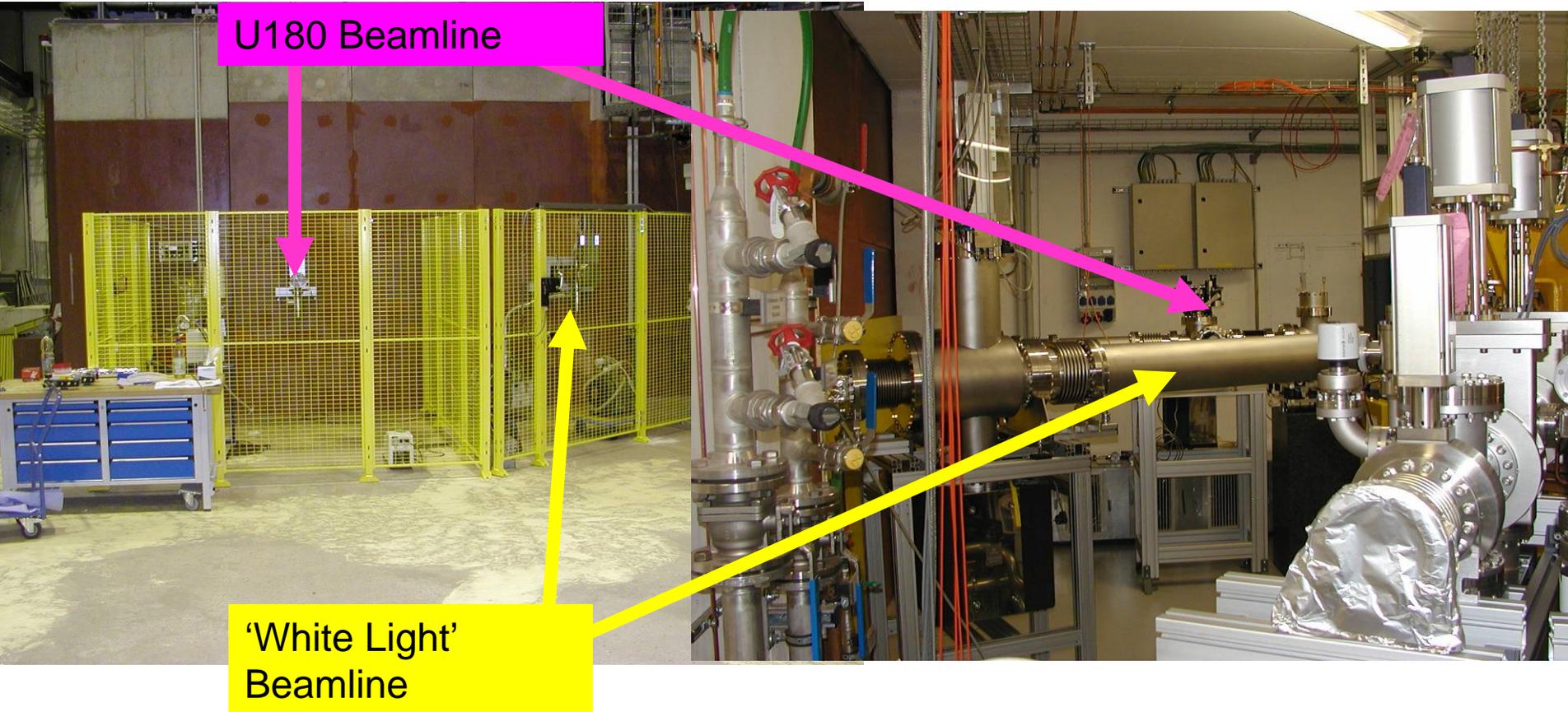






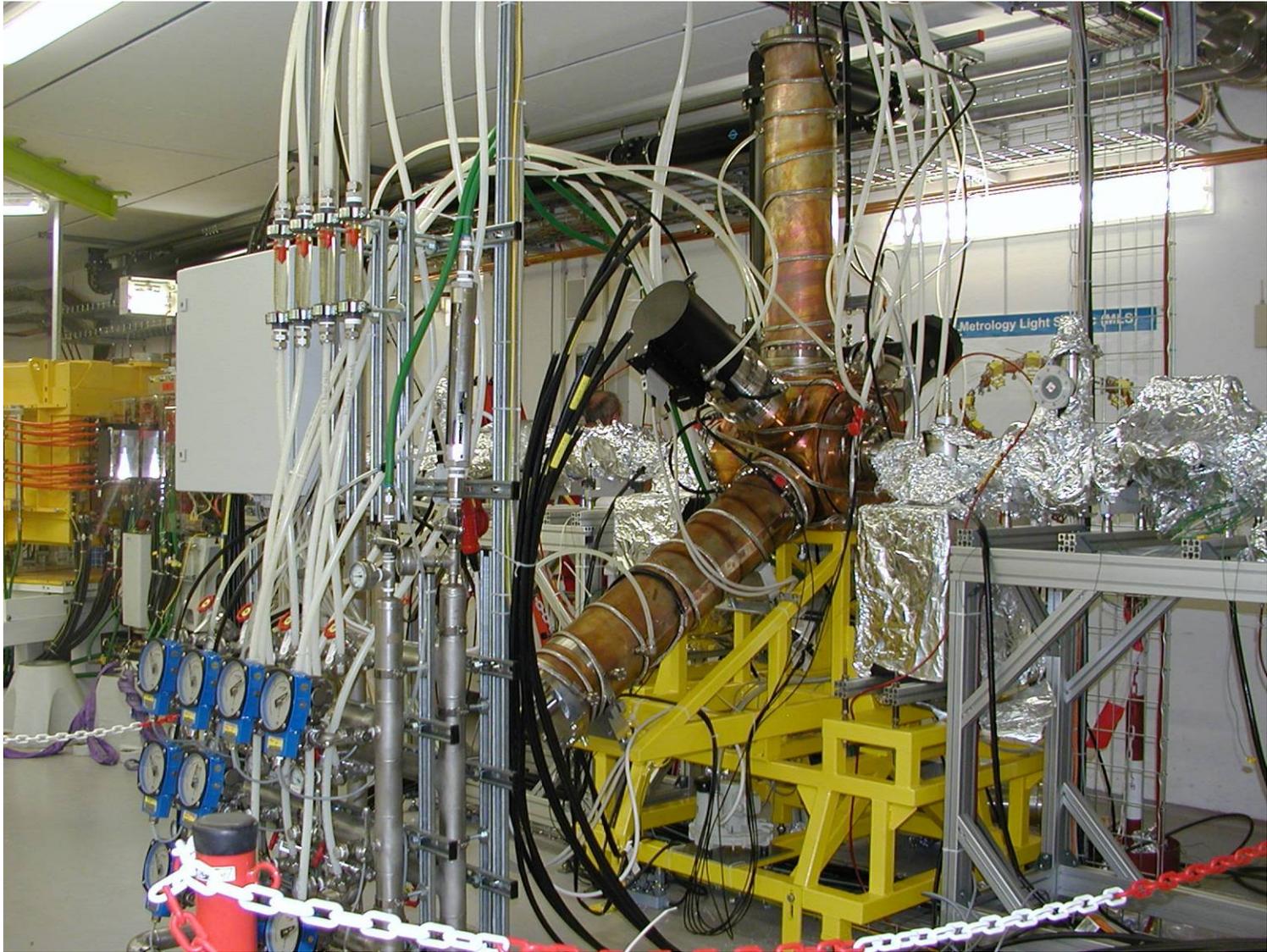
**U 180 vacuum chamber installed**



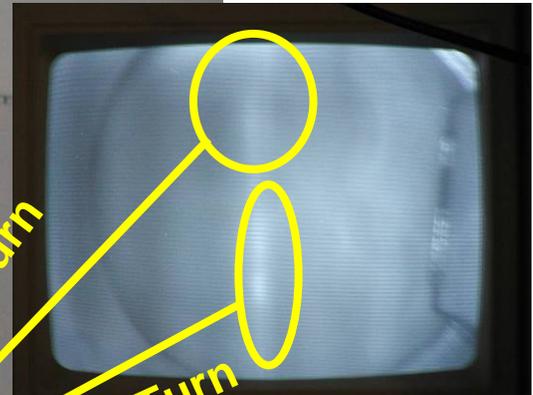
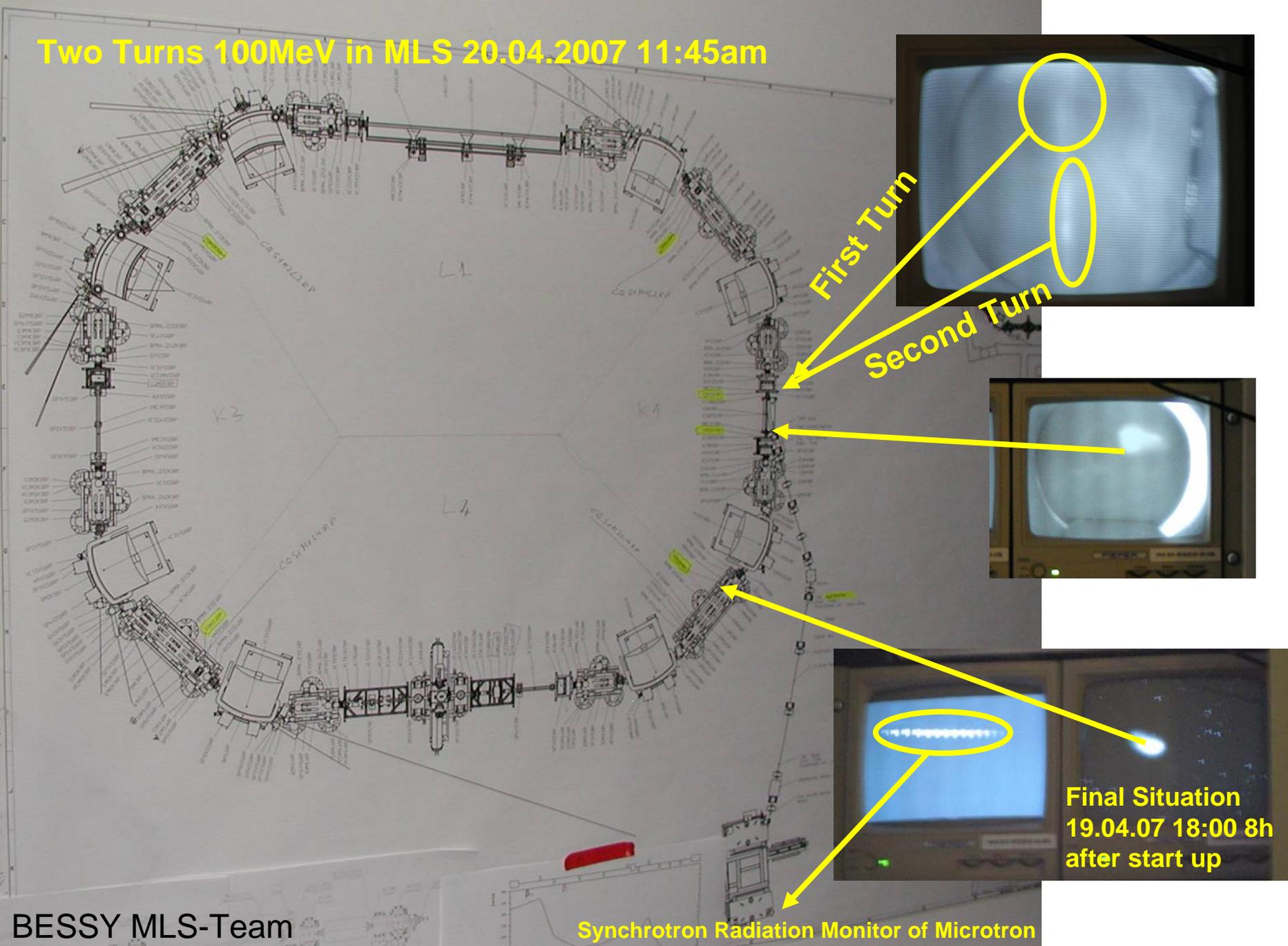


U180 Beamline

'White Light'  
Beamline



Two Turns 100MeV in MLS 20.04.2007 11:45am



BESSY MLS-Team

Synchrotron Radiation Monitor of Microtron