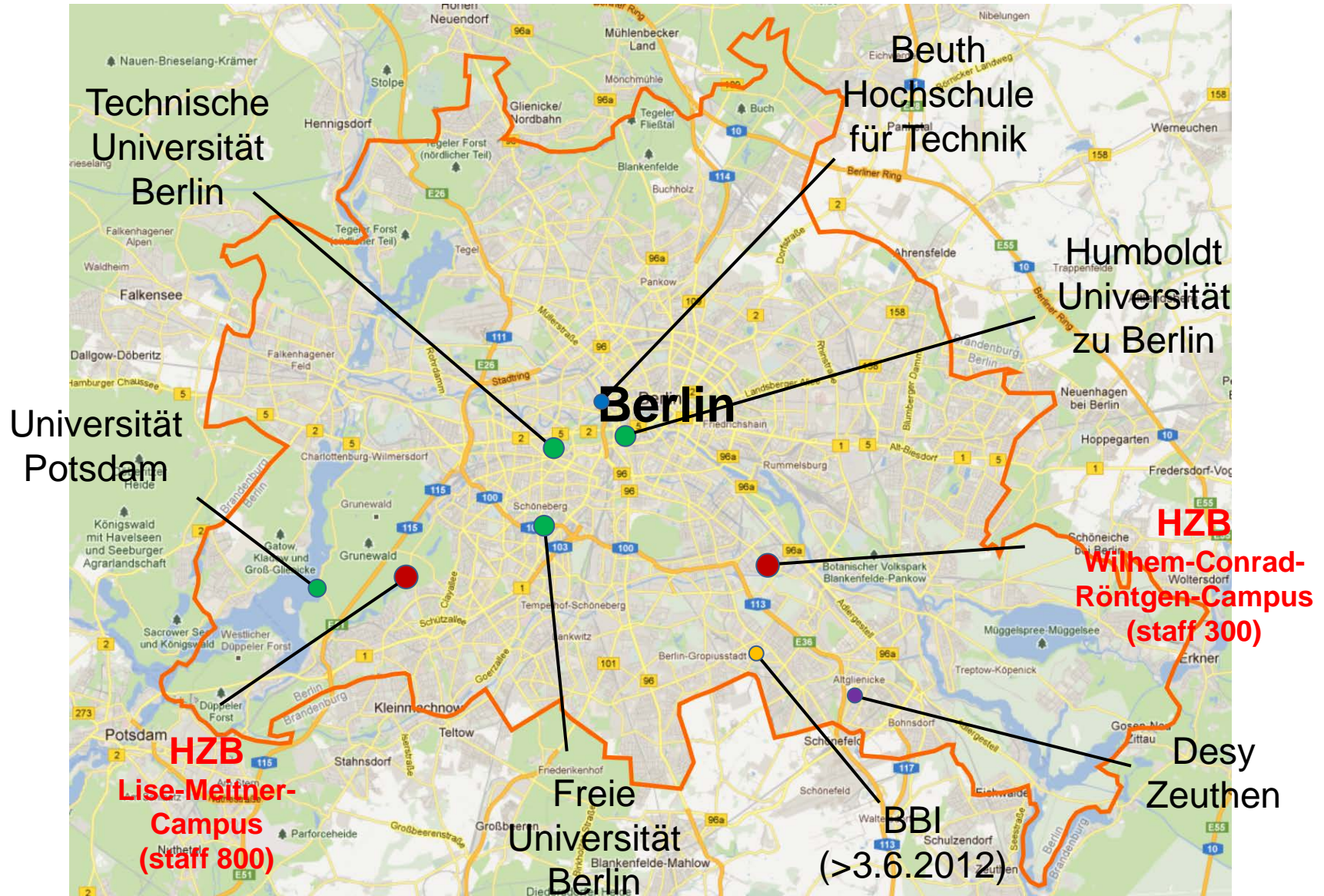


A Short Introduction to HZB's Detector Laboratory



HELMHOLTZ-ZENTRUM BERLIN

Th. Wilpert



Neutrons (LMC)

- BERII Research Reactor since 1992
- Thermal Power 10 MW
- Low Enriched Uranium (since 2000)
- Neutron Flux $1.2 \cdot 10^{14} \text{ cm}^2 \text{ s}^{-1}$
- Cold Source: ^1H 13.6 bar @ 26 K
- 24 Experiments (16 cold, 9 thermal)
- Detector laboratory

Upgrades (finished 2012)

- New Cold Source: Gain >1.5
- New Super Mirror Guides and Experiment Upgrades: Gain up to 10
- High Field Magnet: **30 Tesla** (DC)
- ESS test beam line
- NEAT: TOF Spectrometer (2014)

Photons (WCRC)

- BESSY2 Commissioned in 1996
- Electron Beam 1.72 GeV, 300 mA
- Operation Modes: Single Bunch, Multi Bunch Hybrid, Low-alpha
- Emittance: $6 \cdot 10^{-9} \text{ mrad}$
- Pulses: 100 fs, 2 ps, 50 ps
- Energy Range: 6 meV – 150 keV
- 14 Insertion Devices
- More than 50 Beamlines for Experiments

Upgrades

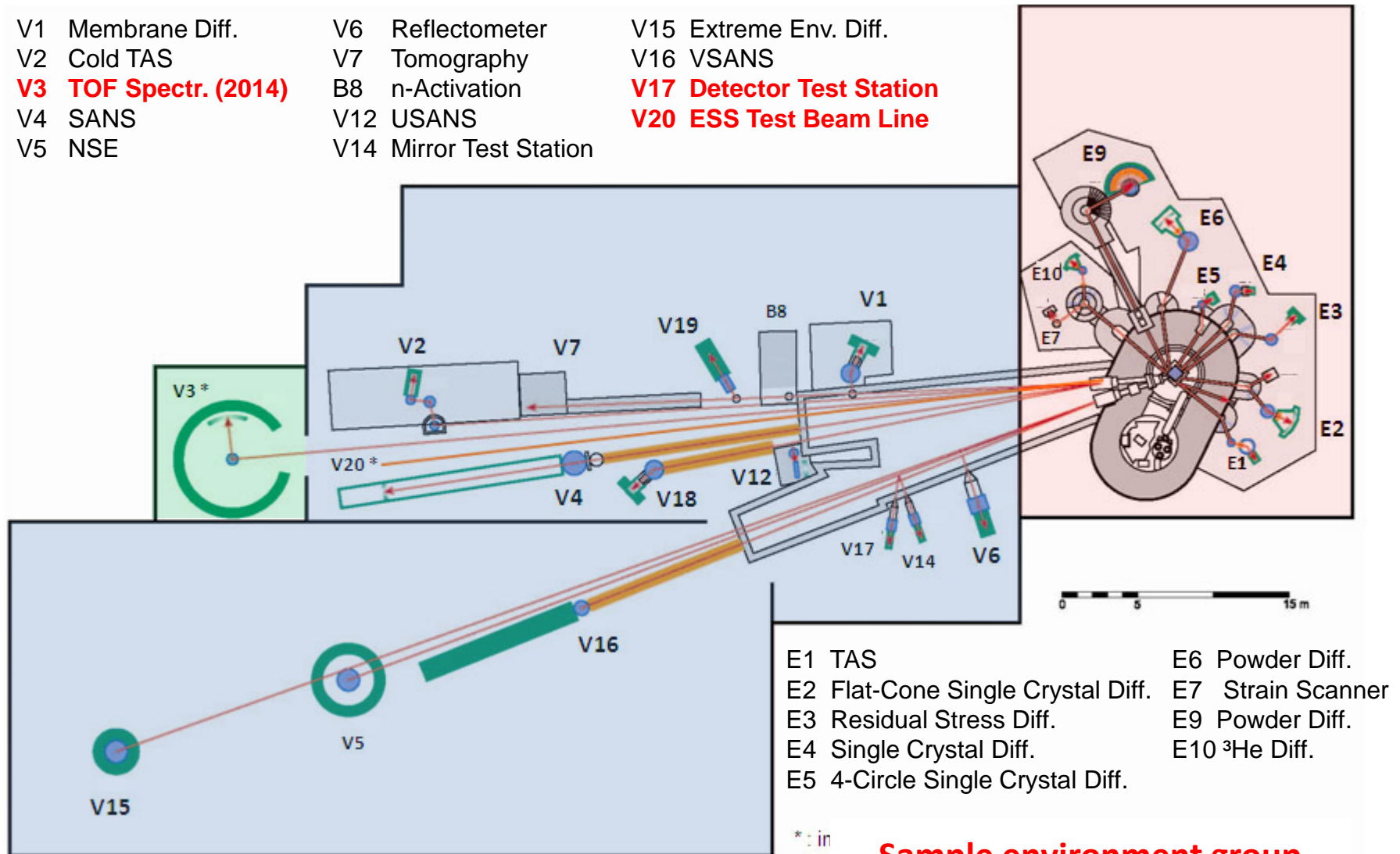
- Continuous Improvement of Accelerator System (e.g. top-up operation)
- Installation of new beam lines for spectroscopy, microscopy and scattering
- *BERLinPro*

Budget: 110 M€

V1 Membrane Diff.
V2 Cold TAS
V3 TOF Spectr. (2014)
V4 SANS
V5 NSE

V6 Reflectometer
V7 Tomography
B8 n-Activation
V12 USANS
V14 Mirror Test Station

V15 Extreme Env. Diff.
V16 VSANS
V17 Detector Test Station
V20 ESS Test Beam Line

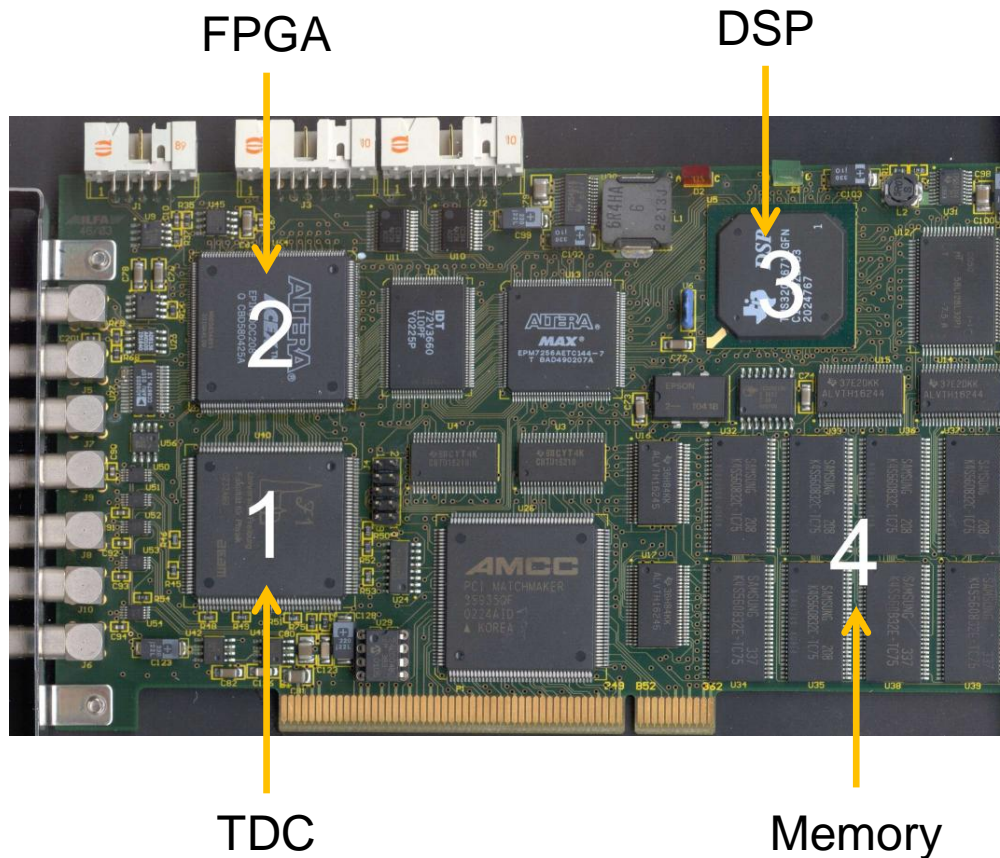


Sample environment group

Proposals and Current Activities

- 3.6 Intelligent programmable hardware: Readout board for delay line detectors
- 3.9 Development of mobile test system with HZDR for detector characterization with ultra-short x-ray pulses. Development of UHV compatible photon detection system
- 3.11 Development $^{10}\text{BF}_3$ detectors for large area TOF spectrometers, safety system
- ^{157}Gd -CsI MSGC detector (ESS design update)
- Structured ^{10}B -multi-layer detectors (ESS design update, NMI3)

3.6 Readout board for delay line detectors



- Made in 2001 (HMI-JINR)
- 50% of Neutron Exp.
- PCI phasing out (components anyway!)
- New design needed
- Interest by others!
- Little own resources (shrinking electronic group)
- Collaboration most welcome!

3.11 $^{10}\text{BF}_3$ Detectors for Large Area TOF Spectrometers



ILL: IN5, 384 ^3He tubes (2850 l) 30 m²

^{157}Gd -CsI MSGC detector (ESS design update)

^{157}Gd CsI

ADC board with test points for validation

ASIC board

Virtex 5 FPGA

Adapter board

- ASIC (MSGCROC) development in collaboration with AGH Krakow
- Test of new uplink board next week

4.5 mm