

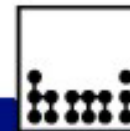
EPOS – Eine hochintensive Positronenquelle an der ELBE-Strahlungsquelle im FZ Rossendorf

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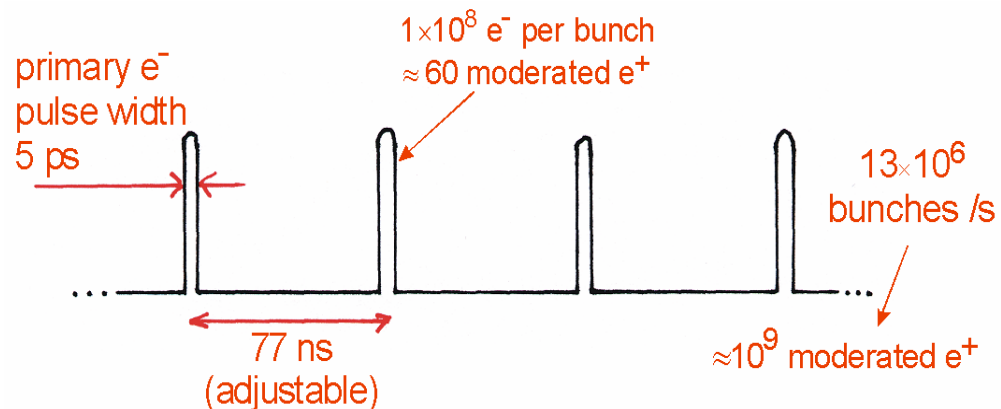


Berlin, 1.10.2003



The EPOS positron source at Research Center Rossendorf

- main experiment: Radiation source ELBE (Electron Linac with high Brilliance) and low Emittance
- primary electron beam ($40 \text{ MeV} \times 1 \text{ mA} = 40 \text{ kW}$) is already available
- main goal: IR Free-electron Laser
- very interesting time structure: cw-mode of short bunches

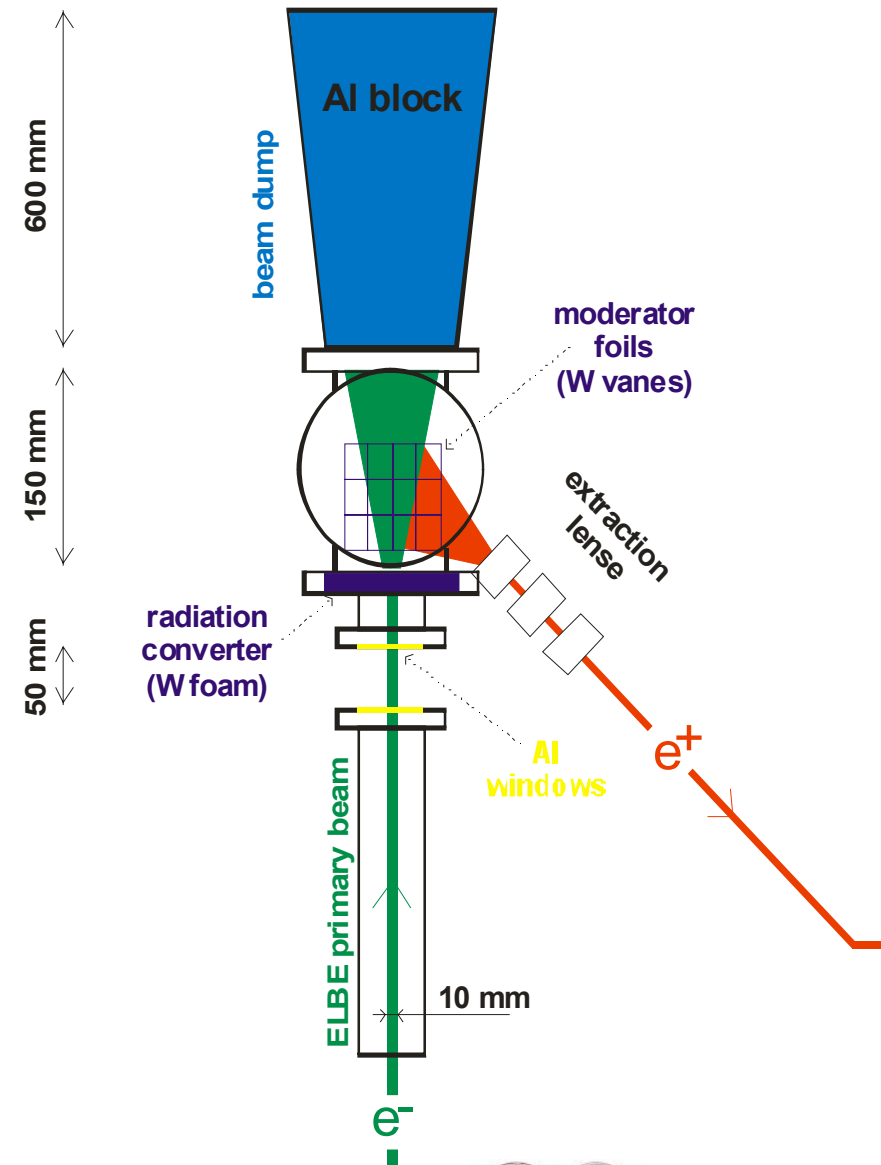


electron bunches

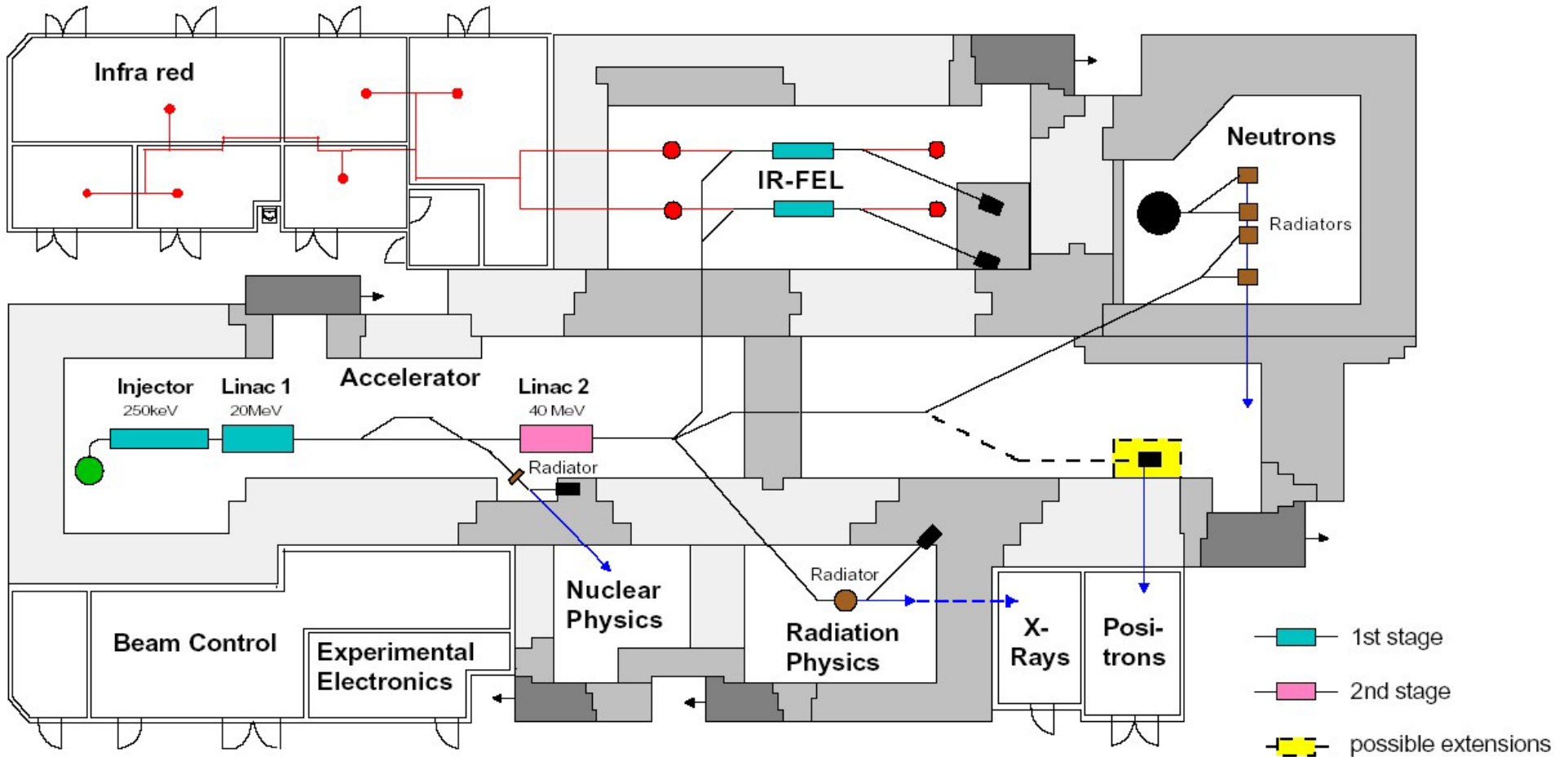
EPOS = ELBE Positron Source

- intensive beam of slow (monoenergetic) positrons
- all relevant positron techniques for materials research (positron lifetime, Coincidence Doppler broadening, AMOC)
- EPOS is external facility of Martin-Luther-University Halle at Research center Rossendorf
- in collaboration with FZR
- user-dedicated facility

Electron-Positron Converter in Cave 111b

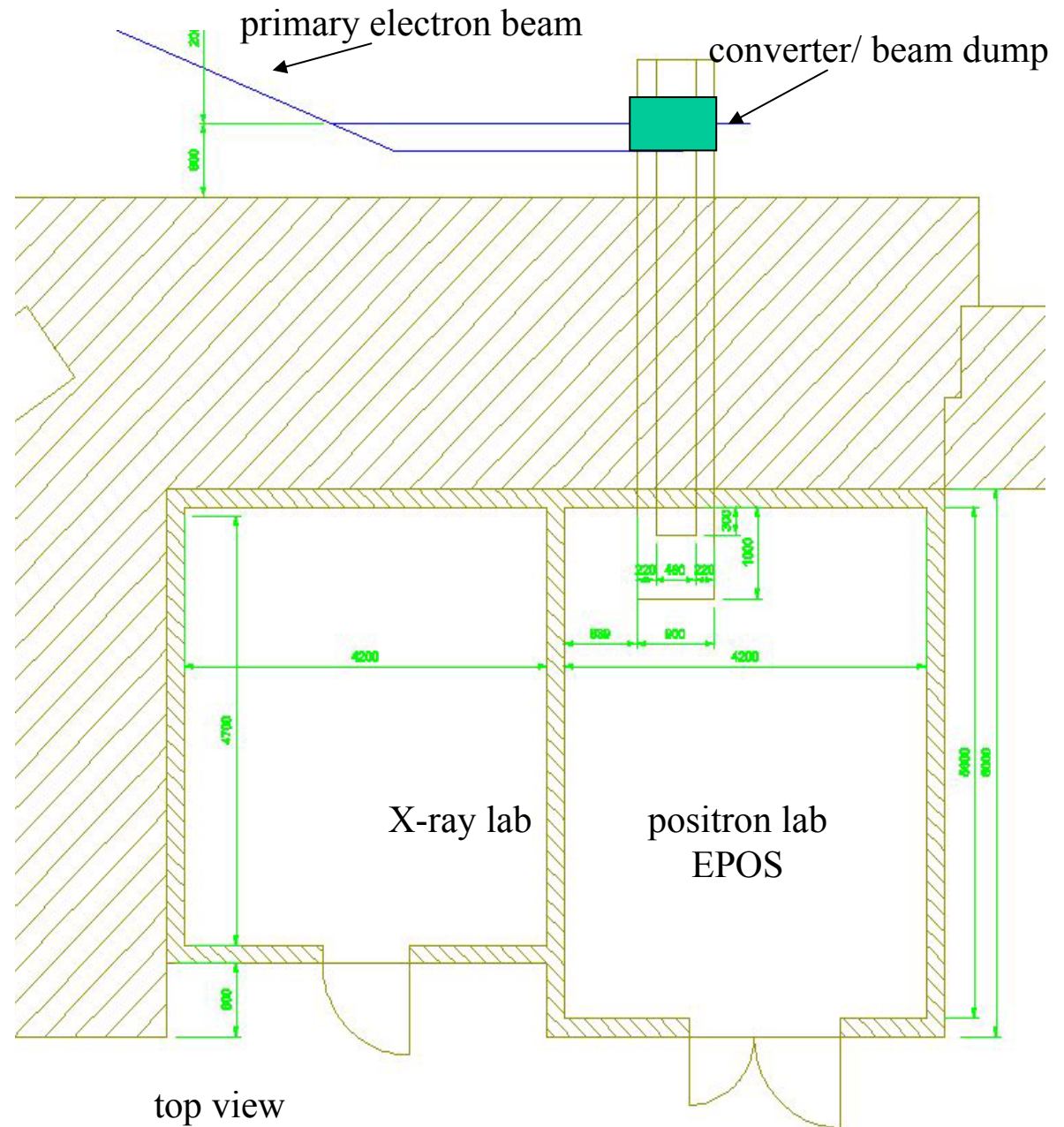


Ground plan of the ELBE hall



Ground plan of positron lab

- Construction work of lab started
- Basic financing by University Halle and Land Sachsen-Anhalt



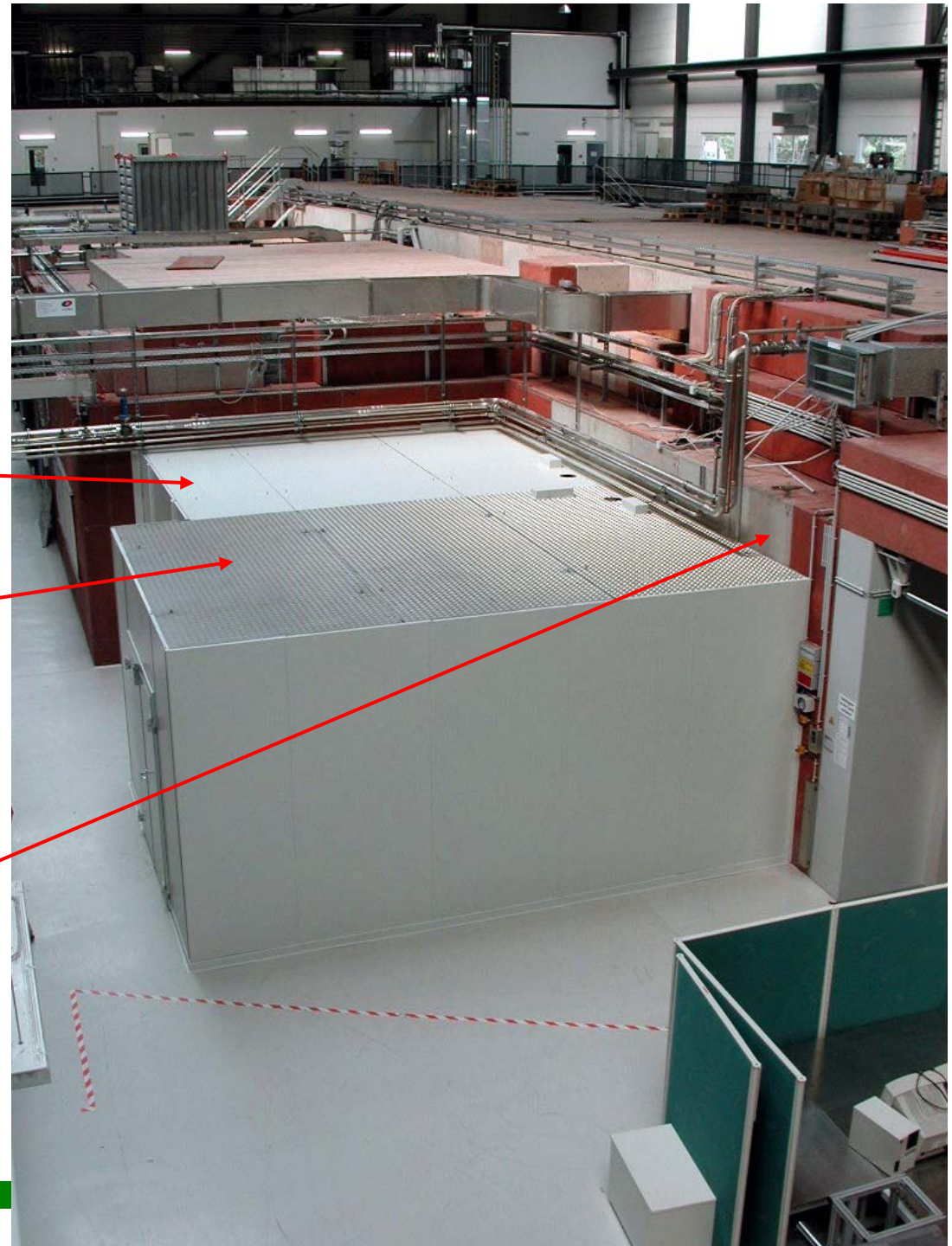
Positron Lab

- positron lab in ELBE hall already under construction

X-ray Lab

Positron Lab

concrete screening of Cave 111b
(location of e^+ converter)

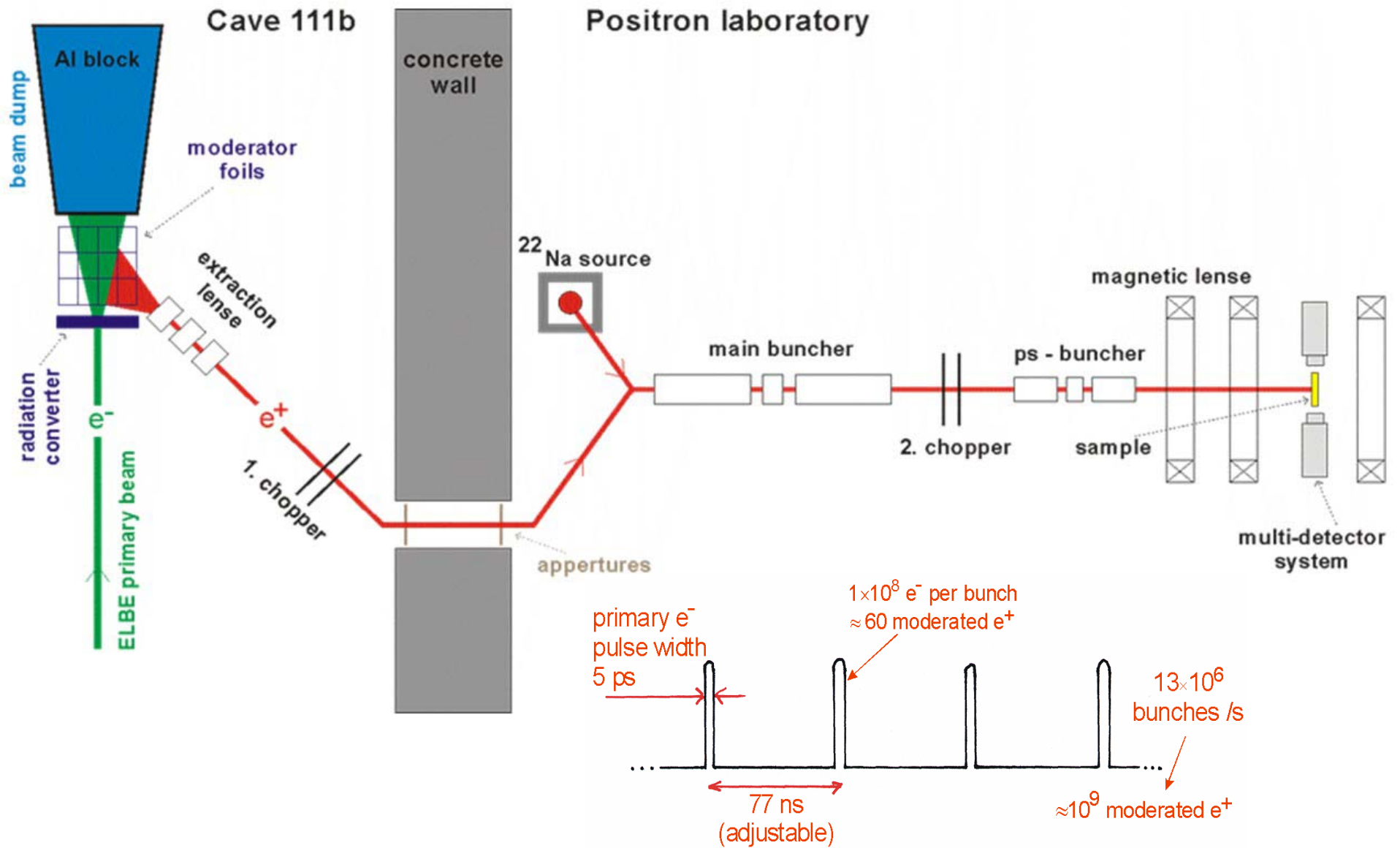




concrete screening of Cave 111b

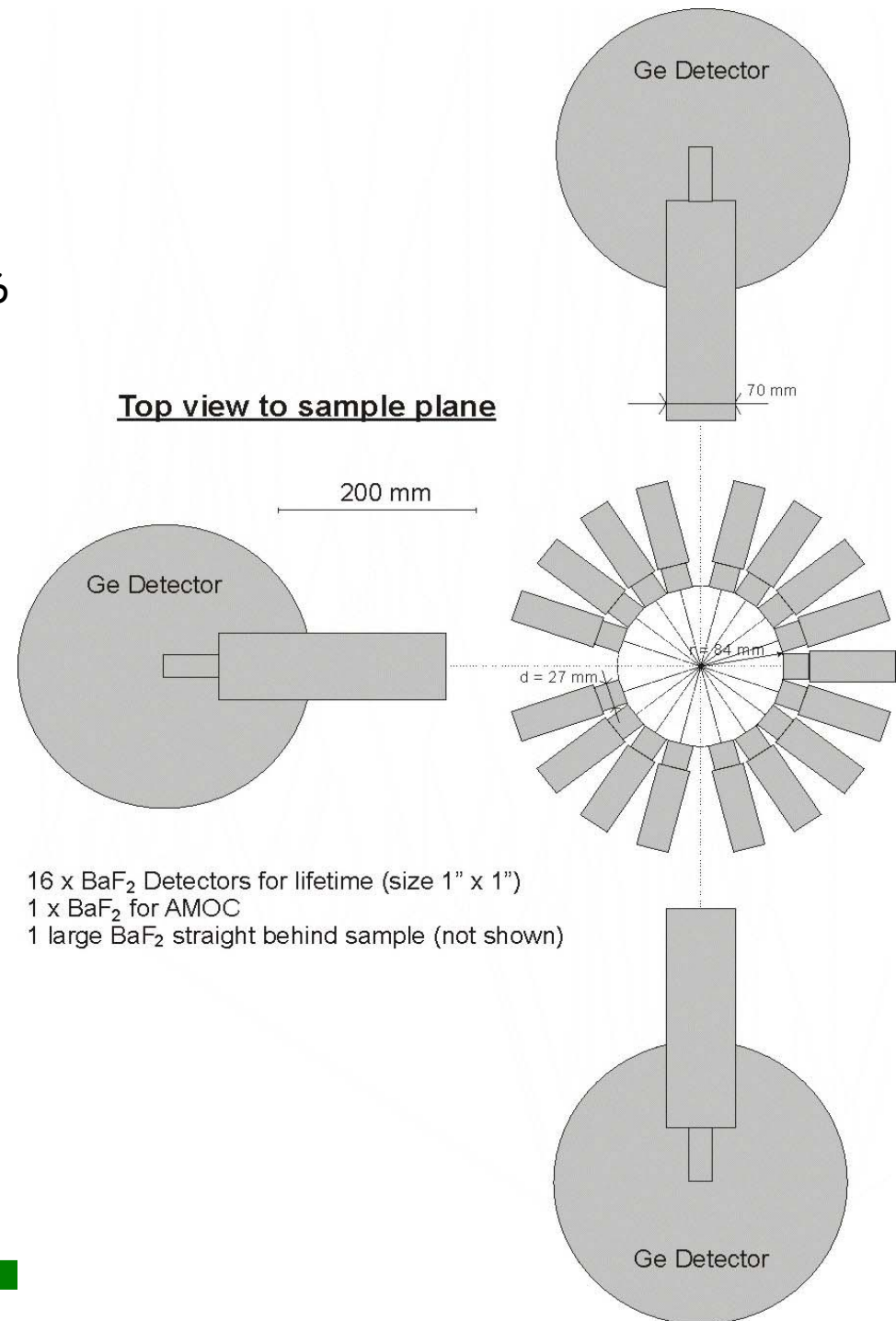
cable tunnel to be used for e^+ beamline

EPOS (ELBE Positron Source)



Detector system

- **3 experiments:** lifetime spectroscopy (16 BaF₂ detectors); Doppler coincidence (2 Ge detectors), and AMOC (1 Ge and 1 BaF₂ detector)
- **digital detection system:**
 - lifetime: almost nothing to adjust; time scale exactly the same for all detectors; easy realization of coincidence
 - Doppler: better energy resolution and pile-up rejection expected



Time Schedule

	1. Year	2. Year	3. Year
Laboratory	██████████		
Simulation e ⁺ converter	██████████		
Simulation beam	████████████████		
Converter chamber and vacuum system in tunnel	██████████████		
Screening of converter chamber		██████	
First chopper / buncher		██████	
Test converter / beam transport		██	
Vacuum system completion		██████	
Conventional source chamber		██████████████	
2. Chopper / buncher		██████████	
Sample chamber			██████████
Completion of beam electronics			██████
Test transport system			██████
Detector system and software	██		
Automation			██
Software lifetime / Doppler spectra			████████████████
Optimization of time resolution			████████████████



Thank you for your attention!

This presentation can be found as pdf-file on our Websites:
<http://positron.physik.uni-halle.de>
<http://positronannihilation.net>

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