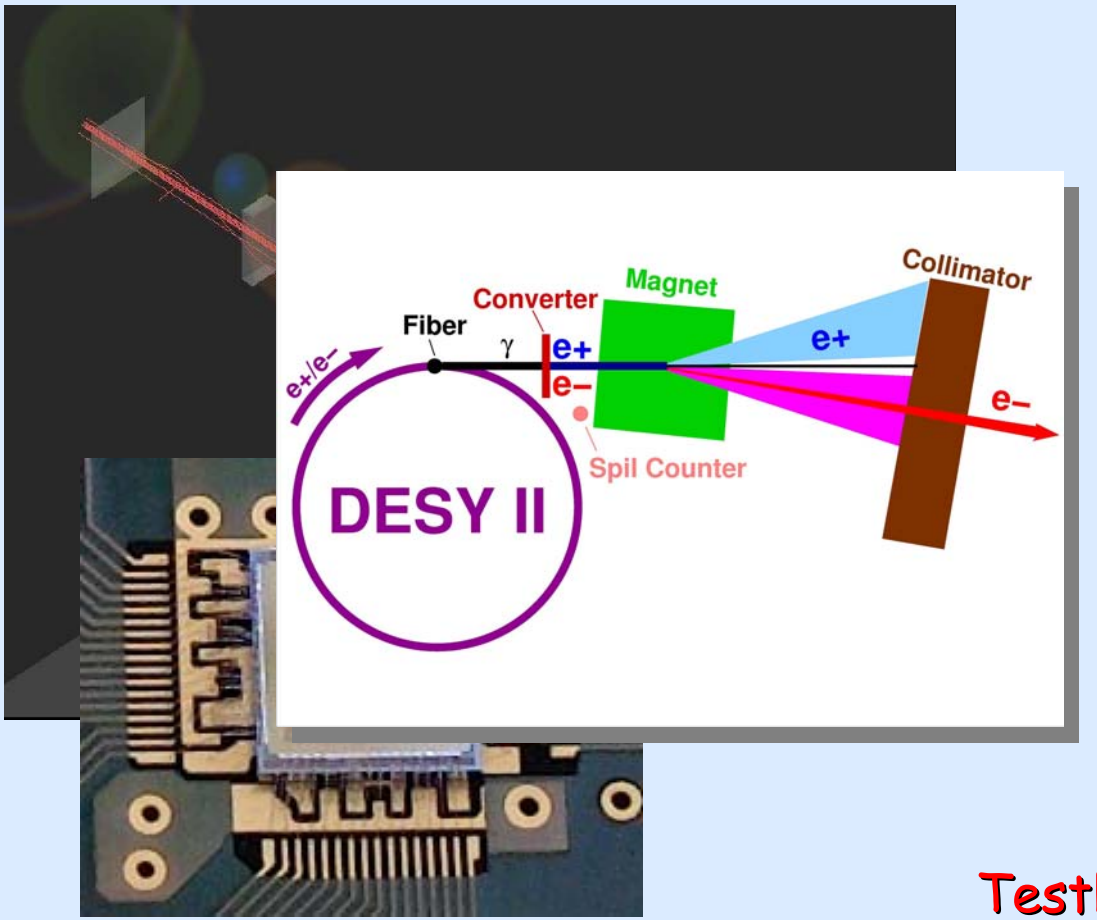
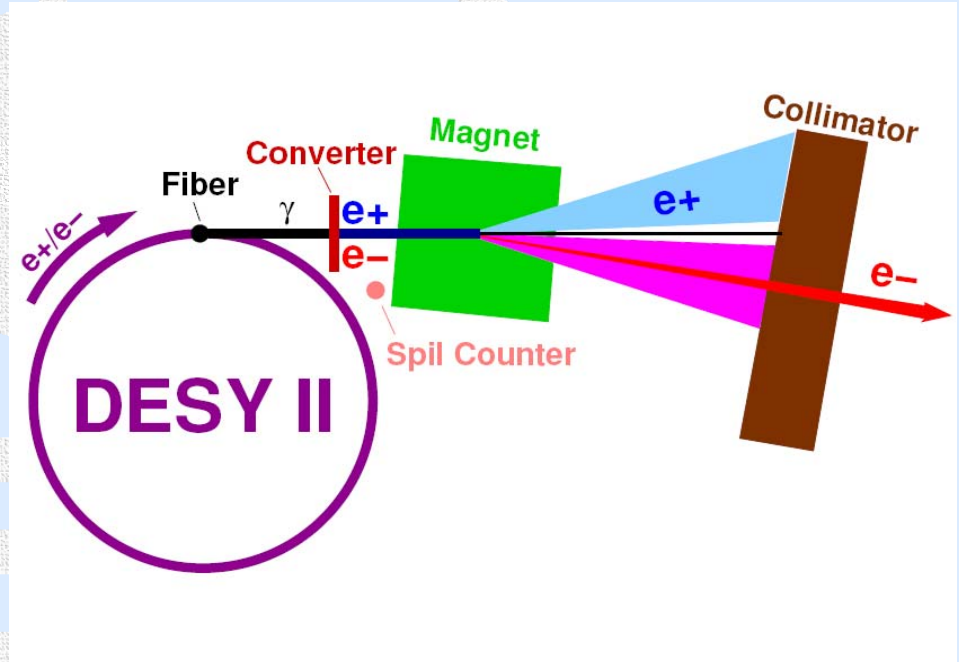
DESY Test Beam Facilities - Status and Plan



Testbeam Workshop
January 17th 2007
Fermilab

DESY Test Beam

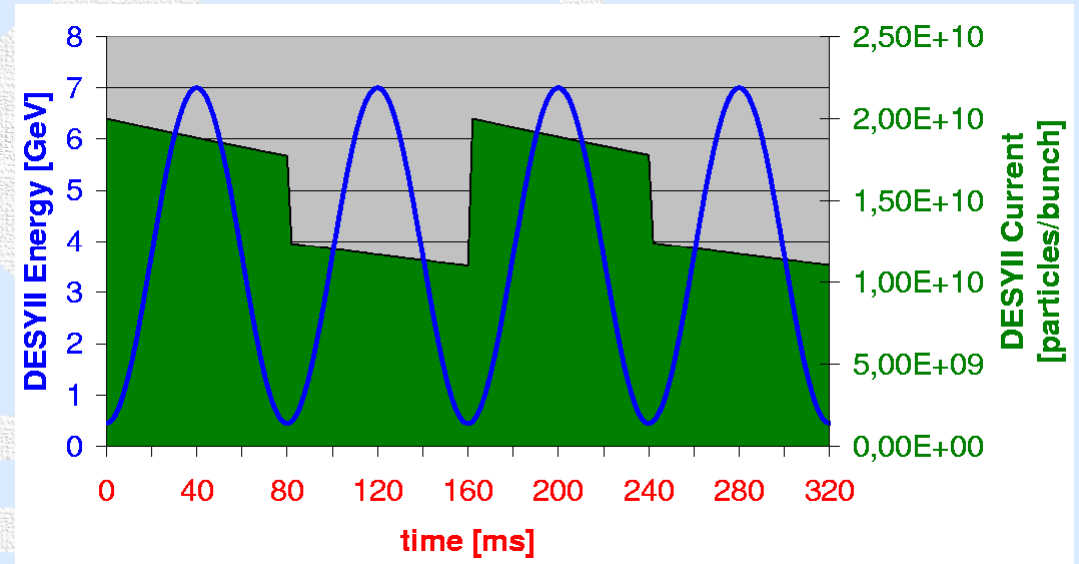
- DESY provides three test beam lines with 1-6GeV/c electrons
- Very simple system, no beam optics, only momentum selection via magnet



- Bremsstrahlung beam generated by DORIS and PETRA (synchrotrons).
  - For DORIS: DESY II delivers every second cycle (160ms) single bunches with about $1*10^9$ electrons (positrons) with 4.5GeV
  - For PETRA: DESY II delivers every fourth cycle (320ms) single bunches with $3*10^{10}$ electrons ($1*10^{10}$ positrons) at 7GeV
    - Test beam runs in PETRA mode
- Photons are converted to electron positron pairs with a metal plate.
- Beam is spread out into a horizontal fan with a dipole magnet.
  Collimator cuts out final beam.
- The revolution frequency is 1 MHz, the RF frequency 500 MHz, and the bunch length around 30 ps. The average radius is 46.6 m

DESY Test Beam

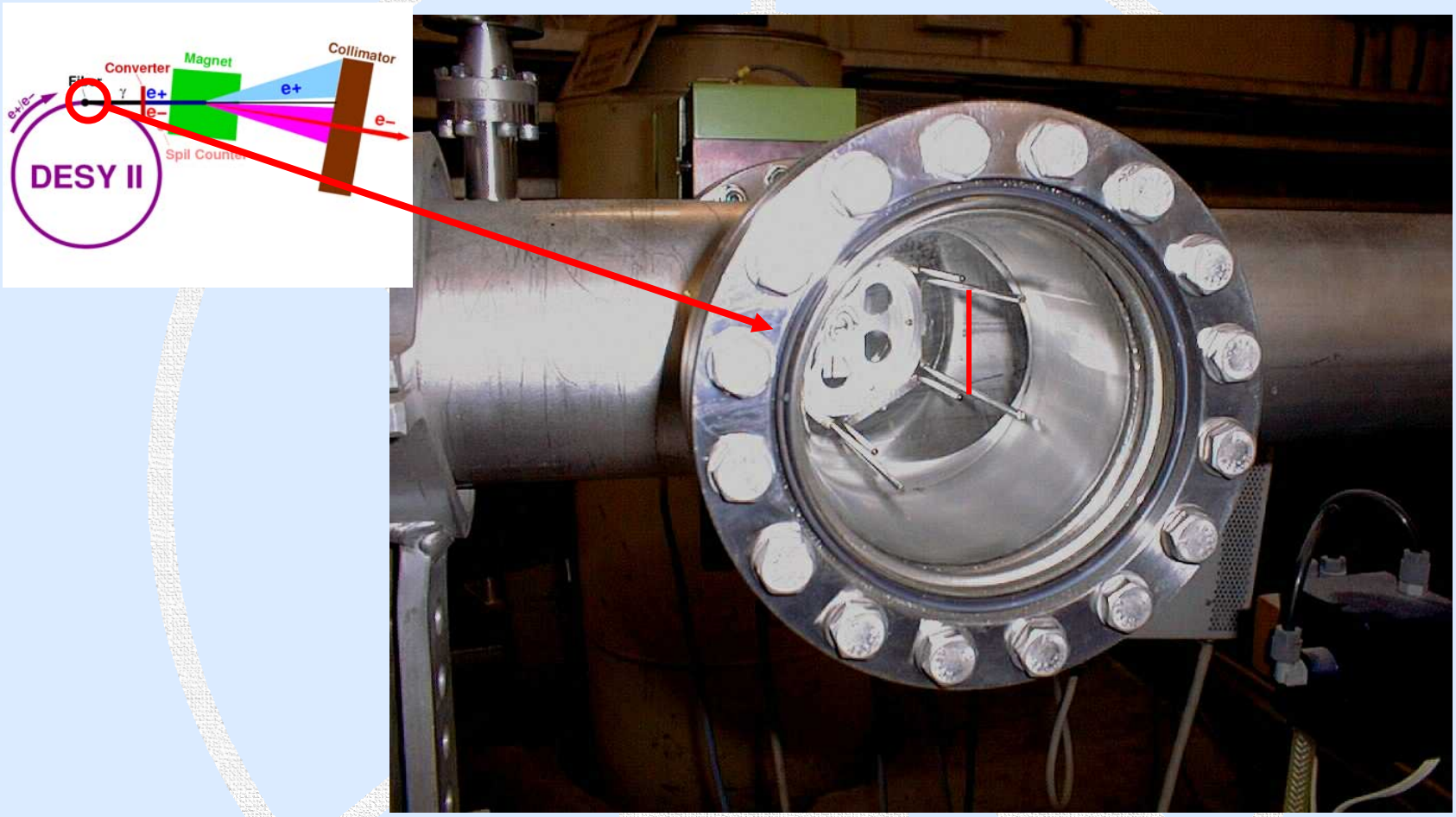
- Ideal DESY II Cycle (no extraction)



- The rates are influenced by many parameters.
- Ideally, the maximum rate around 1 kHz (3 GeV, 3mm Cu convert, Collimator ca. 5mm x 5mm, DESY II maximum energy at 7 GeV, no beam extraction, no DESY III ramp).
- Few hundred Hearts are realistic

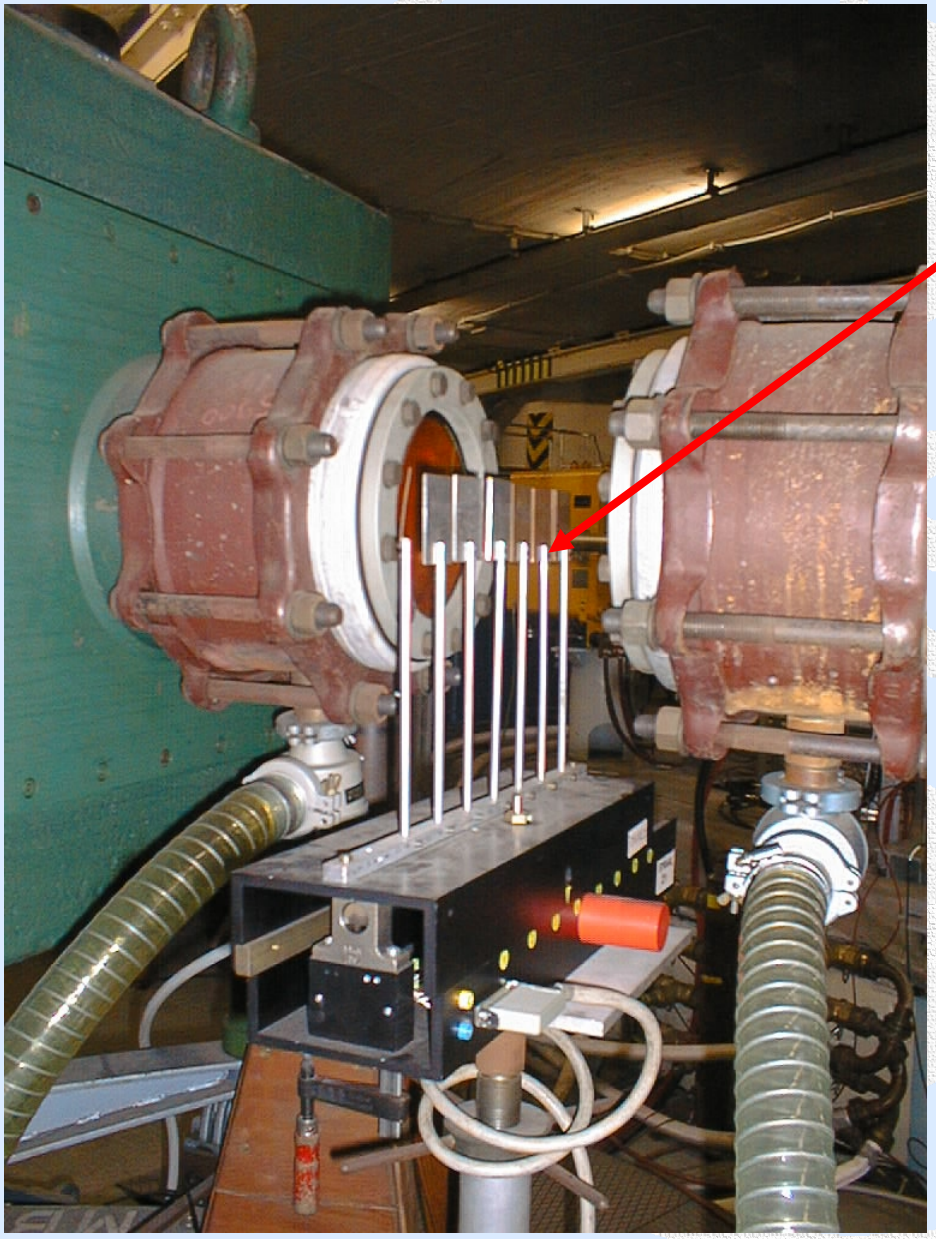
Rates	Target	
Energy	3mm Cu	1mm Cu
1 GeV	~330 Hz	~ 220Hz
2 GeV	~500 Hz	~330 Hz
3 GeV	~1000 Hz	~660 Hz
5 GeV	~500 Hz	~330 Hz
6 GeV	~250 Hz	~160 Hz

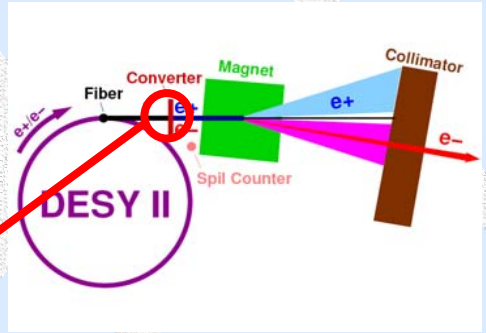
Carbon Fibre



- The carbon fibre has a thickness of 6-10 µm.
- Six fibres are prepared inside the fibre holder. By rotation of the inner part, a broken fibre can be replaced without opening the machine vacuum.

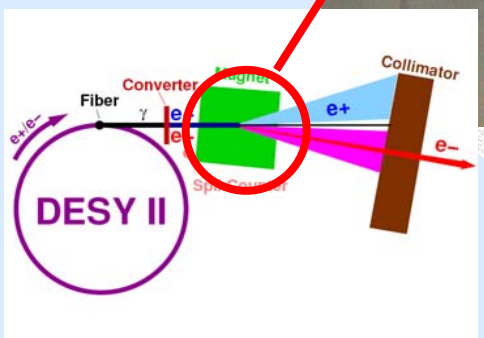
Conversion Target



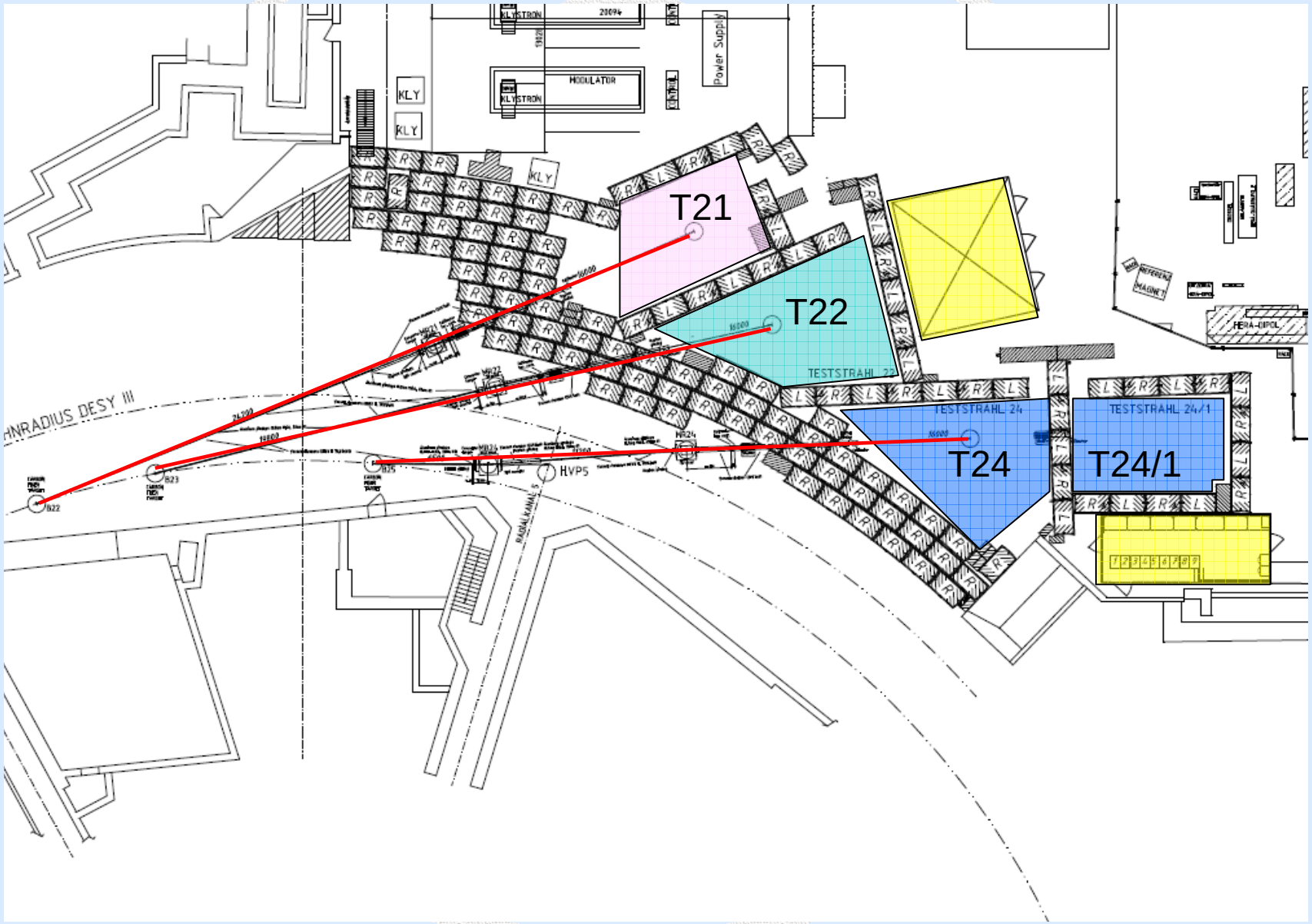


- There are different conversion targets available:
  - Al, Cu,
- The selection of the conversion target is under control of the testbeam user

Test Beam Layout



Testbeam Layout

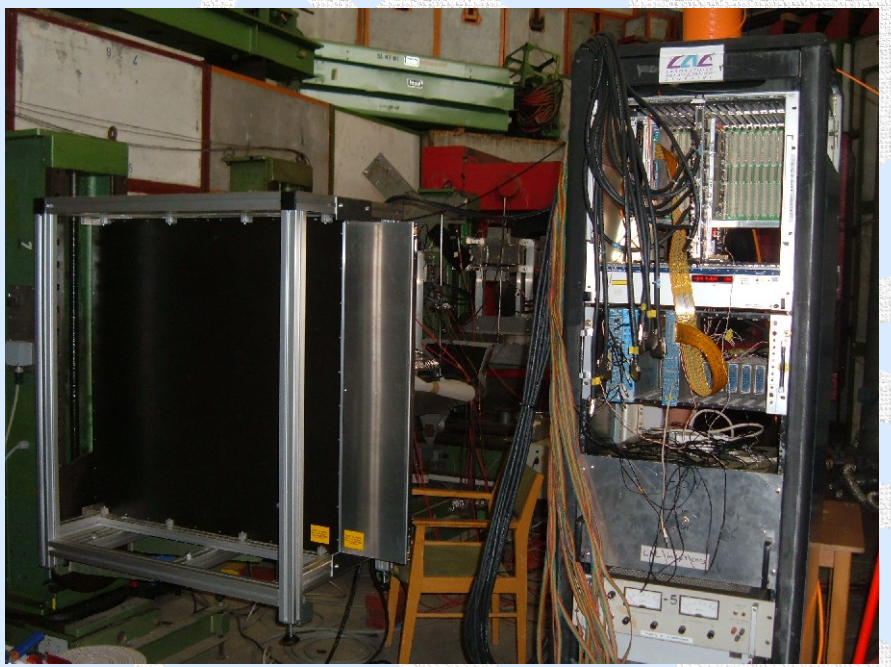


Facilities for Test Beam User

- All three testbeam lines have
  - Interlock systems
  - Magnet control
  - Patch panels with preinstalled cables
  - Gas warning systems
  - Fast internet connection (DHCP)
- You can ask for:
  - Translation stages
  - Premixed gases
- You have to bring:
  - Data Acquisition incl. computers
  - Trigger scintillators

Test Beam Area 21

- Mainly used by HCAL, ECAL and TPC (ILC)



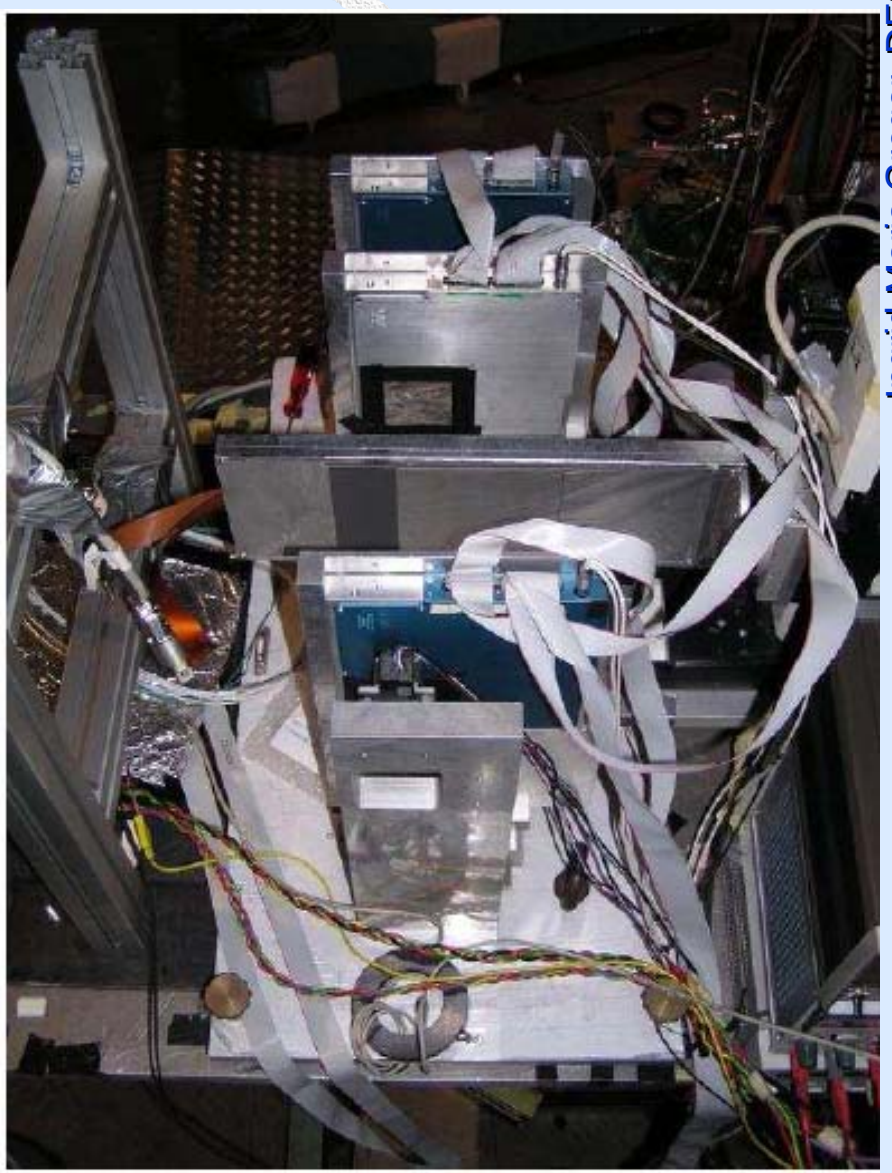
E. Garutti

- Plans for first half of 2007
  - calibration of HCAL modules - 4 at the time as soon as they get produced (HCAL Group DESY)
  - commissioning of Japanese scintillator ECAL with SiPM readout (Shinshu and Kobe universities + HCAL group DESY)

Testbeam 22: ZEUS Telescope

- Location of ZEUS MVD telescope (build in 1998)
- Telescope parameters:
  - 300 um thick single-sided Si strip sensors
  - Each plane with 2 sensors prependicular to each other
  - Strip pitch: 25um
  - Readout pitch: 50um
  - Active area: 32x32 mm^2
  - Trigger window: 8x8 mm^2
- Plans for next years: keep telescope running

Contact: Uli Koetz and Ingrid Gregor



HERMES test 2004

Testbeam 24: EUDET

- “Reserved” for EUDET JRA1 initiative (Telescope and Magnet)
  - See talk from Felix Sefkow

Future Changes at Testbeam

- 2007: small improvements
  - Light, paint, webpages, …
- First half of 2008: long shutdown
  - New Vacuum System
  - New Control System
- Plans for the future
  - Maintain testbeam facilities
    - Proof of principle
    - Calibrations etc.
- Impact of PETRA3 on test beam right now under evaluation

Summary

- DESY provides three test beam lines with 1-6GeV/c electrons
- Very simple system, no beam optics, only momentum selection via magnet
- Infrastructure simple and flexible
- If you need to use the DESY testbeam -> request beam time through Norbert Meyners (testbeam.desy.de)