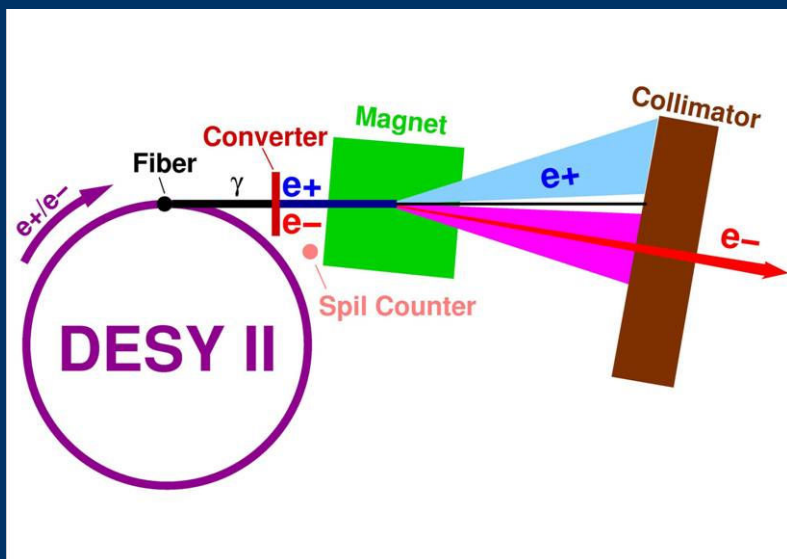




DESY Test Beam Facilities - Status and Plan



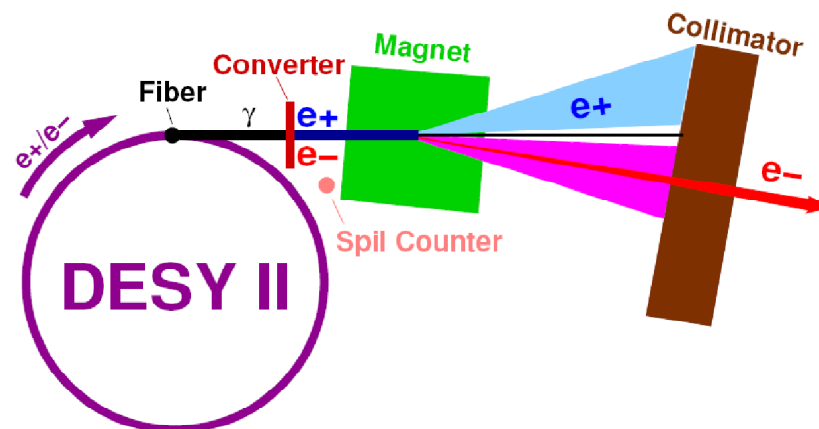
Norbert Meyners, DESY

LCTW 09

Orsay, 3.-5. Nov. 2009

DESY Test Beam

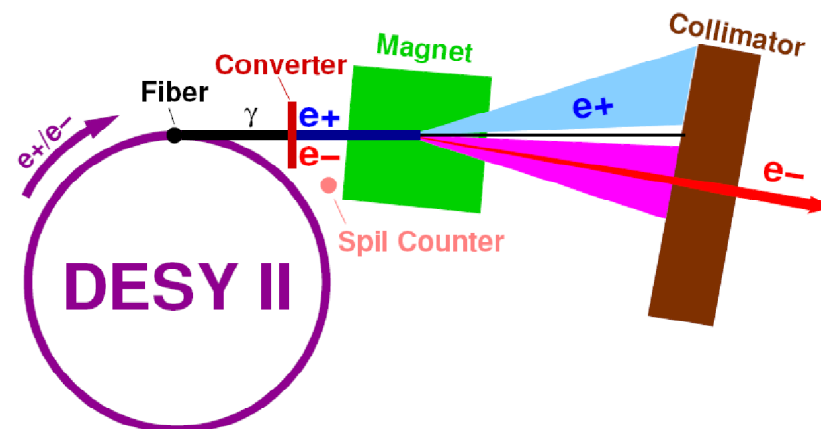
- DESY provides three test beam lines with 1-5 (-6) GeV/c electrons
- Very simple system, no beam optics, only momentum selection via magnet.
- Bremsstrahlung beam generated by a carbon fibre in the circulating beam of the electron/positron synchrotron DESY II.



- 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.

DESY II

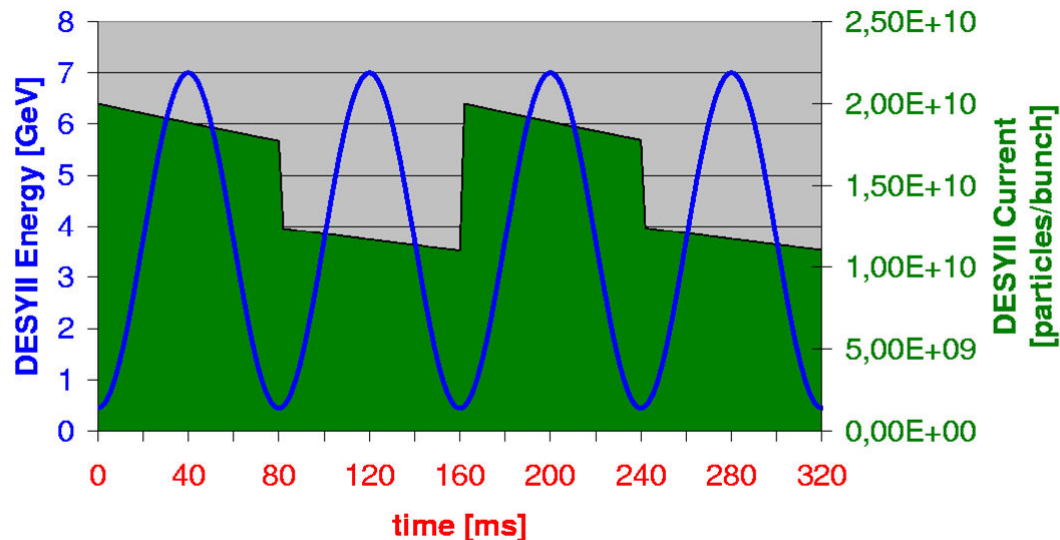
- Mainly injector for DORIS and PETRA (synchrotron light sources).
 - ➔ Long Up Times (10-11 month/a)
 - ➔ Demand: High Reliability
 - ➔ Not much room for improvements for the test beams
- The revolution frequency is 1 MHz, the RF frequency 500 MHz, and the bunch length around 30 ps. The average radius is 46.6 m
- For DORIS: DESYII delivers every second cycle (160ms) single bunch with about $3 \cdot 10^9$ positrons at 4.5GeV
- For PETRA: DESYII delivers every fourth cycle (320ms) single bunch with $1 \cdot 10^{10}$ positrons ($3 \cdot 10^{10}$ electrons) at 6GeV
- Test beam runs in old PETRA mode at 7GeV possible



DESY Test Beam

- Ideal DESY II Cycle (no extraction)

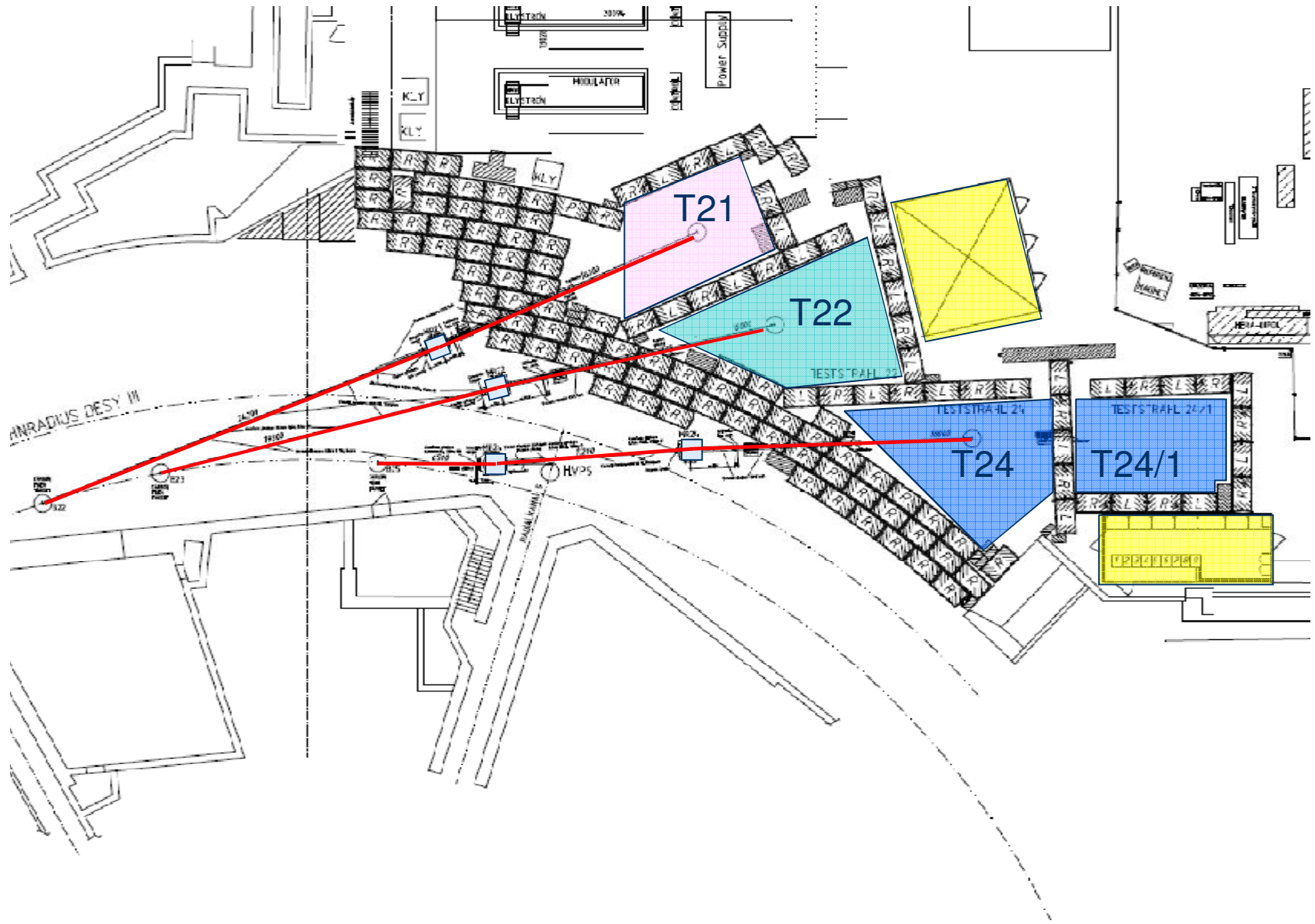
Rates	Target	
Energy	3mm Cu	1mm Cu
1 GeV	~2.2 kHz	~ 0.5 kHz
2 GeV	~4.6 kHz	~1.1 kHz
3 GeV	~5.2 kHz	~1.3 kHz
4 GeV	~4.4 kHz	~1.1 kHz
5 GeV	~2.8 kHz	~0.5 kHz
6 GeV	~1.5 kHz	~0.2 kHz



- 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 Hertz are realistic

In practice is the maximal event rate around 2 kHz.
(3 GeV, 3mm Cu convert, Collimator ca. 5mm x 5mm)

Test Beam Layout



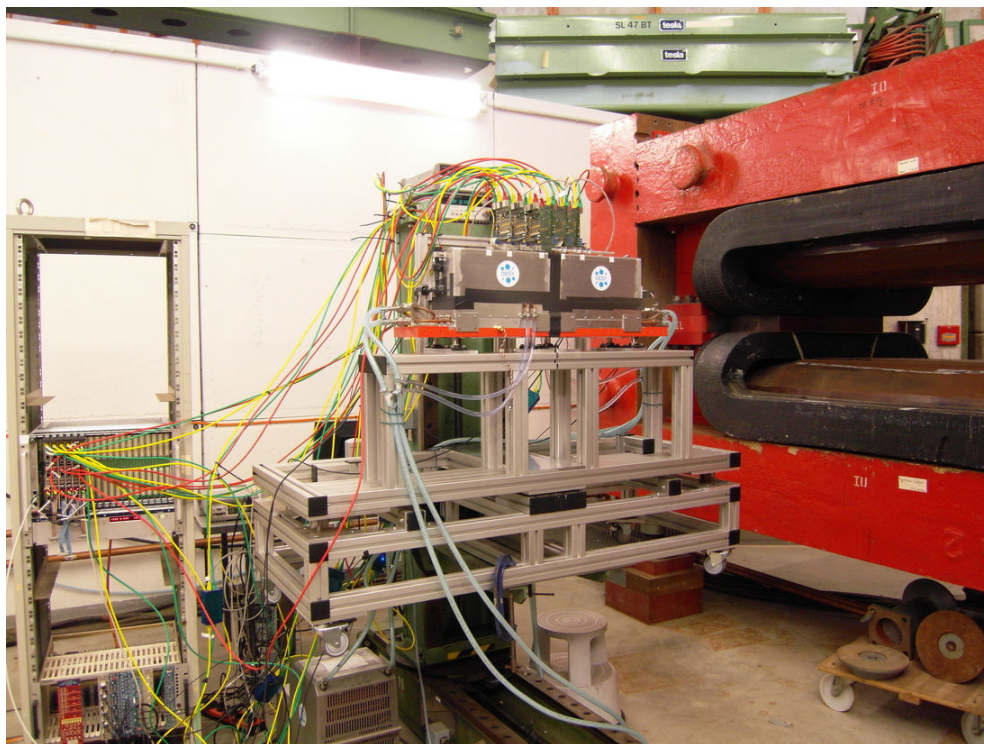
Facilities for Test Beam User

- All three test beam lines have
 - Interlock systems
 - Magnet control
 - Patch panels with preinstalled cables
 - Gas warning systems
 - Fast internet connection (DHCP)
- The user can ask for:
 - Translation stages
 - Premixed gases
 - Superconducting Magnet (1T)
 - Big Dipole Magnet (1T)
 - Beam Telescopes:
 - MVD Telescope
 - EUDET Telescope
- The users typically bring:
 - Data Acquisition incl. computers
 - Trigger scintillators



Test Beam Area 21

- Recently refurbished -> New home of EUDET telescope



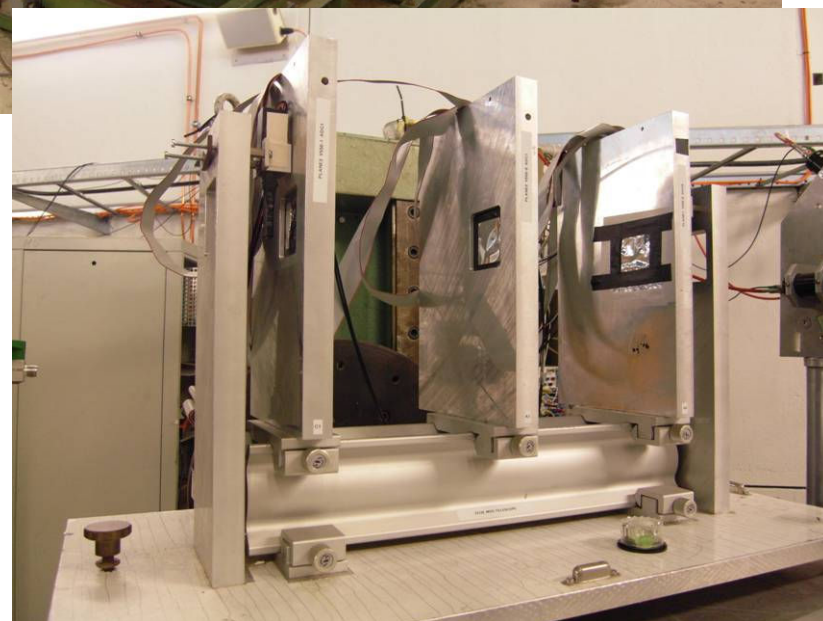
- Pixel beam telescope:
 - 6 layers of Monolithic Active Pixel Sensor (MAPS) detectors
 - DEPFET and ISIS pixel detectors for validation
 - DAQ system
 - Demonstrator telescope in use since summer 2007

More information

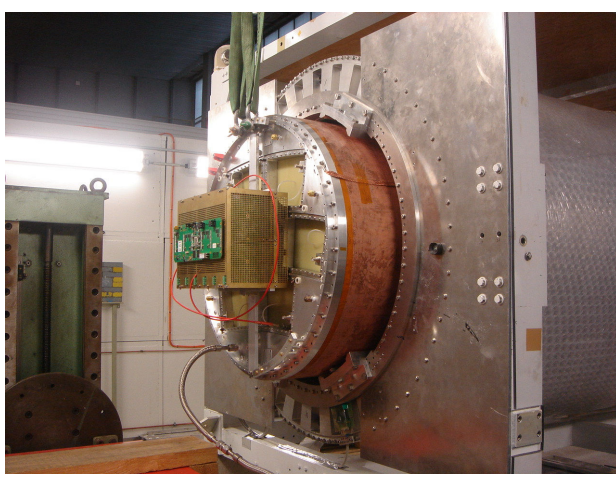
WWW.EUDET.ORG

Test Beam 22: ZEUS Telescope

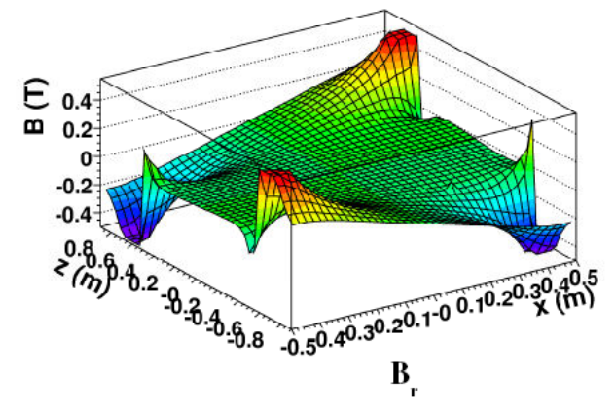
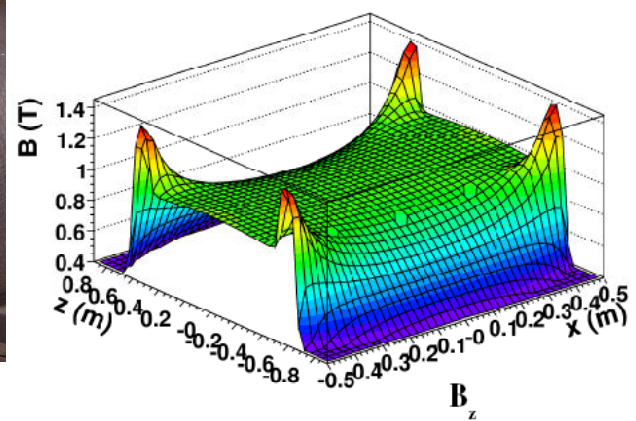
- Location of ZEUS MVD telescope (build in 1998)
- Telescope parameters:
 - 300 μm thick single-sided Si strip sensors
 - Each plane with 2 sensors perpendicular to each other
 - Strip pitch: 25 μm
 - Readout pitch: 50 μm
 - Active area: 32x32 mm^2
 - Trigger window: 8x8 mm^2
 - DAQ was upgraded to EUDET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



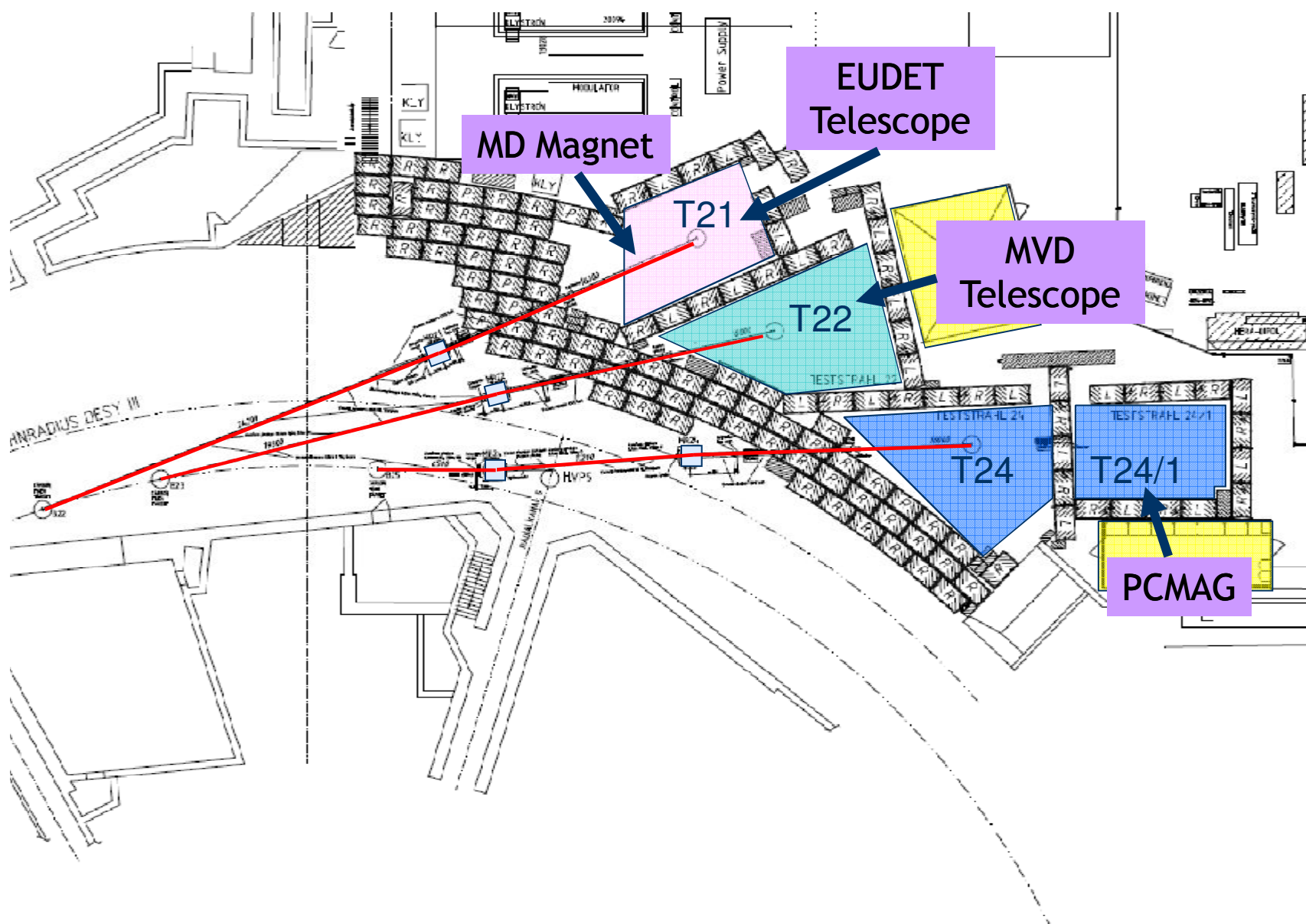
Test Beam 24: EUDET



- Large bore magnet:
 - 1Tesla, $\varnothing \approx 85$ cm, stand-alone He cooling, supplied by KEK
 - infrastructure (control, field mapping, etc.) through EUDET
 - Magnet fully instrumented at DESY and ready for use



Test Beam Layout



Review 2008/2009

2008

- 8 Month Shutdown
 - A lot of work on the accelerator sub-systems (Complete new water cooling etc.) to increase the **reliability** of the injector for PETRAIII
 - Test beam vacuum system renewed!
- 3 User Groups + LCTPC collaboration

2009

- 7 User Groups + LCTPC collaboration
- Several 1-1½ week breaks due to work on new power supplies!
 - This task could not be finish in the long shutdown!
 - Should be finished in the shutdown January-February 2010
 - Mainly the LCTPC collaboration was effected
- New wave guide to spare RF-system (ready March 2010)

Outlook 2010

- Extend shutdown: Restart 22. February 2010 (tbc.)
- Machine study weeks every 6 weeks possible (DORIS/PETRA Service Weeks)
 - ➔ “No (stable) beam mo fr 8 12!!!”
- Under discussion: break (2 weeks) in summer
- The EUDET telescope should be operational from March on
- PETRA will **NOT** start top-up-mode
 - ➔ Chance to run DESY II at 7GeV

By the way:

- Ingrid/EUDET wants to build a demonstrator* telescope by re-using the demonstrator analog pixel chips. Should be ready by end 2010!

Availability and Summary

- DESY test beam is running from 22. Feb on throughout 2010
- Machine study weeks every 6 weeks possible (DORIS/PETRA Service Weeks)
- Users can apply for beam time through DESY test beam coordinators
-> up to three weeks possible, longer terms negotiable

You can apply for test beam time at DESY

testbeam.desy.de

Or contact: testbeam-coor@desy.de

- DESY provides three test beam lines with 1-6GeV/c electrons
- Very simple system, no beam optics, only momentum selection via magnet
- Perfect facility for proof of principle studies, efficiency studies and also resolution studies
- Infrastructure simple and flexible

- Back Up Slides

Schedule 2010 1.Half

02.11.2009

Test Beam at DESY in 2010 1. Half																													
Beam	Responsible	January				February				March				April				May				June							
	Collaboration/Subdetector	04	11	18	25	01	08	15	22	01	08	15	22	29	05	12	19	26	03	10	17	24	31	07	14	21	28		
ALL	NO BEAM																												
	To be confirmed																												
21	Gregor																												
	EUDET Telescope																												
21																													
21																													
21																													
21																													
21																													
21																													
22	Gregor/ Kötz																												
	Telescope																												
22	Timmermans																												
	Silicon																												
22	Frullani																												
	JLab12/SBS-FT																												
22																													
22																													
22																													
24	Dehmelt																												
	LCTPC																												
24																													
24																													
24																													
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24																													

Schedule 2010 2.Half

Test Beam at DESY in 2010 2.Half

Beam	Responsible	July				August				September				October				November				December					
	Collaboration/Subdetector	05	12	19	26	02	09	16	23	30	06	13	20	27	04	11	18	25	01	08	15	22	29	06	13	20	27
All	NO BEAM																										
	Not fixed yet!																										
21	Gregor																										
	EUDET Telescope																										
21																											
21																											
21																											
21																											
22	Gregor/ Kötz																										
	MVD Telescope																										
22	Summer Students																										
	MVD Telescope																										
22																											
22																											
24	Dehmelt																										
	LCTPC																										
24																											
24																											
24																											
24																											

Legende

Priority: high , standard , low

Option: |||| (Equipment in area, Tests possible)

Schedule 2009 1.Half

28.10.2009

Testbeam at DESY in 2009 1. Half		No (stable) beam mo-fr 8-12!!!																											
Beam	Responsible	January				February				March				April				May				June							
	Collaboration/Subdetector	05	12	19	26	02	09	16	23	02	09	16	23	30	06	13	20	27	04	11	18	25	01	08	15	22			
ALL	NO BEAM																												
	SHUTDOWN/PS Test																												
21	Gregor																												
	EUDET Telescope																												
21																													
21	Guler																												
	Cs/I/LC																												
21	Takacs																												
	Pixel Test																												
21																													
22	Gregor/ Kötz																												
	Telescope																												
22	List/Käfer																												
	Polarimeter																												
22	Lukasz																												
	Mimosa																												
22																													
22	Timmermans																												
	Silicon																												
24	Dehmelt																												
	LCTPC																												
24																													
24																													
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24																													
24																													

Schedule 2009 2.Half

Testbeam at DESY in 2009 2.Half															No (stable) beam mo-fr 8-12!!!												
Beam	Responsible	July				August				September				October				November				December					
	Collaboration/Subdetector	06	13	20	27	03	10	17	24	31	07	14	21	28	05	12	19	26	02	09	16	23	30	07	14	21	
All	NO BEAM																										
	PS & Interlock Tests																										
21	Gregor																										
	EUDET Telescope																										
21																											
21																											
21																											
21																											
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22	Gregor/ Kötz																										
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	Silicon																										
22	Tyapkin																										
	ILC, NICA/MPD																										
22	Frullani																										
	JLab12/SBS-FT																										
24	Dehmelt																										
	LCTPC																										
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Legende

Priority: high , standard , low

Option: (Equipment in area, Tests possible)

Legende

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Option: |||| (Equipment in area, Tests possible)