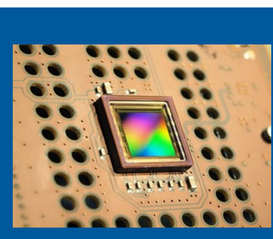
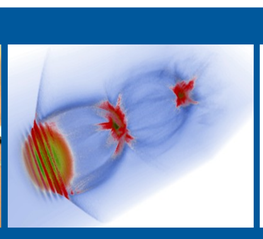
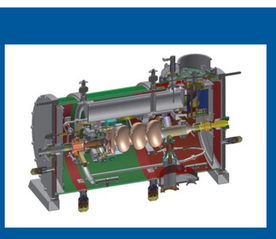
Programme Matter and Technologies

The DESY II Testbeam Facility

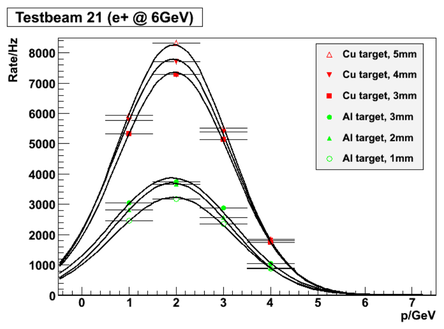
3rd Annual MT Meeting - 2017, GSI Darmstadt

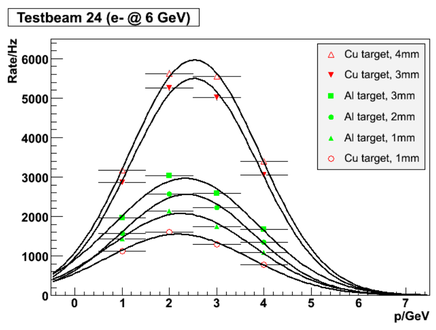
R. Diener, N. Meyners,
O. Schäfer, M. Stanitzki

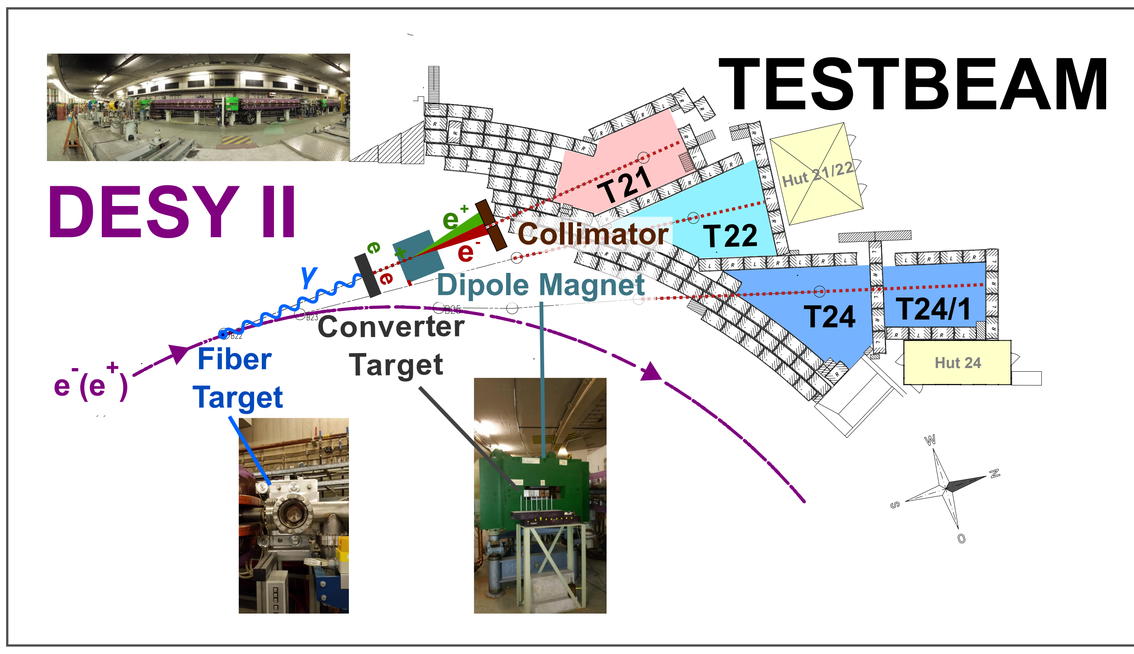
The Beam Lines

The DESY II testbeam facility provides three individual beam lines with electrons/positrons between 1 and 6 GeV/c for testing particle detectors.

- Each beam line fully controlled by the user
- Rates adjusted by collimator and converter target settings







- Each user area comes with an electronics hut and provides:
  - Patch panels for Ethernet, Lemo, HV, fiber optic (SMF+MMF)
  - 30 kg and 1 t stages
  - Beam rate monitor
  - 25 t overhead crane for heavy setups
  - Dry nitrogen
  - HighRes IP Cameras
  - Laser alignment (currently being set up)
  - Full-fledged gas setup, flammable gas mixtures possible




Beam Generation

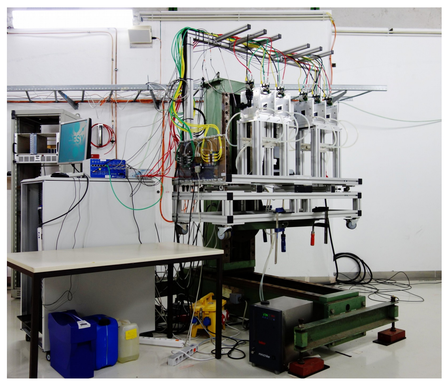
The –mostly single particle– electron or positron beams are produced in the DESY II synchrotron.

- Bremsstrahlung generated by a carbon fiber in DESY II beam
- Photons converted to e^+e^- pairs with converter (metal plate)
- Resulting beam spread out into a horizontal fan with dipole magnet. Final beam cut out with collimator
- Bremsstrahlung spectrum: 1/E dependence.
  Energy distribution of e^+e^- pair nearly flat, geometry fixed by beam pipe. Dipole magnet current selects beam momentum

Pixel Telescopes

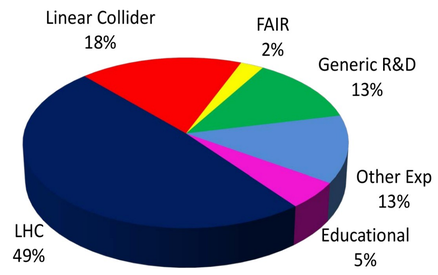
Installed in the areas T21 and T22.

- Dedicated support crew
- MAPS pixel planes:
  - 1 x 2 cm^2 size
  - 18 µm pixel pitch
- Stages to move/rotate Devices-Under-Test (DUT)
- Both arms adjustable to accommodate different DUTs



User Statistics

- 2016: 67 of 105 weeks allocated,
  292 Users from 21 countries,
  49 % from LHC groups
  ~ 70 % telescope usage
- 2017: 46 weeks requested by
  24 groups, ~ 75 % LHC
  ~ 80 % telescope usage



Future: Studies For A New Beamline

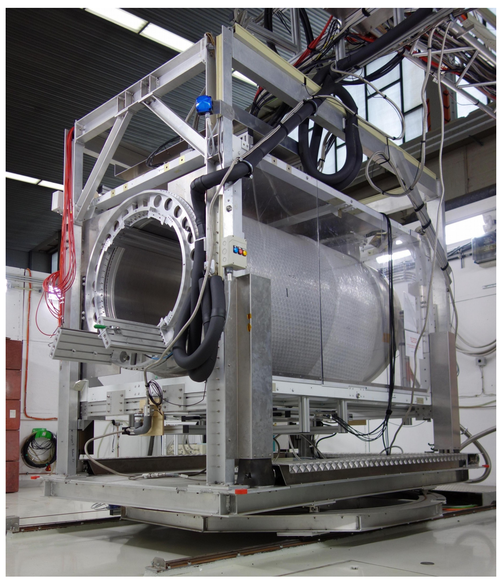
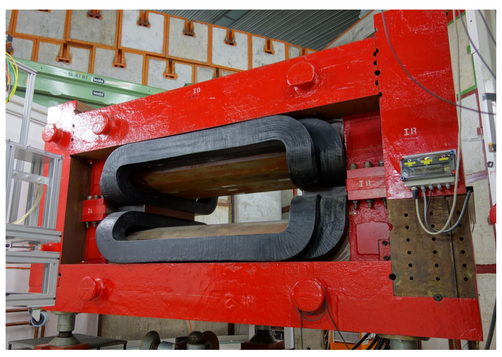
4th line using DESY beam directly (~10^{10} e^-/bunch, 12.5 Hz):

- Studies with 6.3 GeV, high intensities (100 kHz or more), fan-out/collimation: 10^{10} to 100 electrons/cm^2
- Pions/muons: up to 4 GeV / *O*(10) pions / bunch
- Electromagnetic irradiation: intensive shower with E < 1 GeV
- Dedicated workshop planned for summer 2017

Large Bore Solenoid

A large 1 T solenoid magnet is available in area T24/1.

- 85 cm inner bore radius, usable diameter ~75 cm
- Beam and cosmic trigger
- Mounted on movable stage (horizontal, vertical, rotation)
- Can be equipped with a pixel telescope
- Under development:
  Internal telescope with ~75 cm opening for large DUTs

1 T Dipole

In area T21 a large 1 T dipole magnet is available.

Contact

- Information and schedules:
  `http://testbeam.desy.de`
- Beam time requests to
  `testbeam-coor@desy.de`
- Annual call for testbeam and general info:
  Subscribe to
  `testbeam-info@desy.de`

Week		TB21		TB22		TB24/1		TB24
		DATURA	none	DURANTA	none	Telescope in PCMAG	PCMAG	none
2-Jan-17	1	Shutdown						
9-Jan-17	2							
16-Jan-17	3							
23-Jan-17	4							
30-Jan-17	5							
6-Feb-17	6	Startup		Startup		Startup		Startup
13-Feb-17	7	Geo-ATLAS-3D-Dia			LHCb-SCIFI	BELLE-II		
20-Feb-17	8				LHCb-SCIFI			
27-Feb-17	9	ATLAS-3D			AIDA-ITS			
6-Mar-17	10	CMS-Pixel-Phase-1			AIDA-ITS	ATLAS ITk Pixel		
13-Mar-17	11	CMS-Pixel-Phase-1			CALICE-AHCAL	ATLAS ITk Pixel		
20-Mar-17	12	ATLAS-HV-CMOS-Pix				ATLAS ITk Pixel		
27-Mar-17	13	ATLAS-HV-CMOS-Pix						
3-Apr-17	14							
10-Apr-17	15	CMS-Tracker-PSP		CMS-Tracker-2S				
17-Apr-17	16	CMS-Tracker-PSP		CMS-Tracker-2S				
24-Apr-17	17	ATLAS-Strip-Pitch		ATLAS-Strip-Glue				
1-May-17	18							
8-May-17	19							
15-May-17	20			Setup				
22-May-17	21			ATLAS-ITk-Strips				
29-May-17	22			ATLAS-ITk-Strips				
5-Jun-17	23							
12-Jun-17	24	CMS-Tracker-PSP					CALICE-SiW-ECAL	
19-Jun-17	25	CMS-Tracker-PSP					CALICE-SiW-ECAL	
26-Jun-17	26	CMS-Pixel-Phase-2						
3-Jul-17	27	CMS-Pixel-Phase-2		Mu3e				
10-Jul-17	28	Summer Shutdown						
17-Jul-17	29							
24-Jul-17	30							
31-Jul-17	31							
7-Aug-17	32							
14-Aug-17	33							
21-Aug-17	34							
28-Aug-17	35							CBM-TRD
4-Sep-17	36							CBM-TRD
11-Sep-17	37	CMS-Pixel-Phase-2						
18-Sep-17	38	CMS-Pixel-Phase-2						
25-Sep-17	39			Setup				
2-Oct-17	40			ATLAS-ITk-Strips				
9-Oct-17	41			ATLAS-ITk-Strips				
16-Oct-17	42			Mu3e				
23-Oct-17	43							
30-Oct-17	44							
6-Nov-17	45							
13-Nov-17	46							
20-Nov-17	47							
27-Nov-17	48							
4-Dec-17	49	CMS-Pixel-Phase-2		ATLAS-ITk-Pixel				
11-Dec-17	50	CMS-Pixel-Phase-2		ATLAS-ITk-Pixel				
18-Dec-17	51	Beam till 22/12 18:00						
25-Dec-17	52	Shutdown						

MT MATTER AND TECHNOLOGIES
DESY
JÜLICH FORSCHUNGSZENTRUM
HI Jena Helmholtz Institute Jena
HIM Helmholtz Institute Mainz
GSI
HZB Helmholtz Zentrum Berlin
HZDR
KIT Karlsruhe Institute of Technology
HELMHOLTZ ASSOCIATION