# PETRA III

## Ausblick 2018

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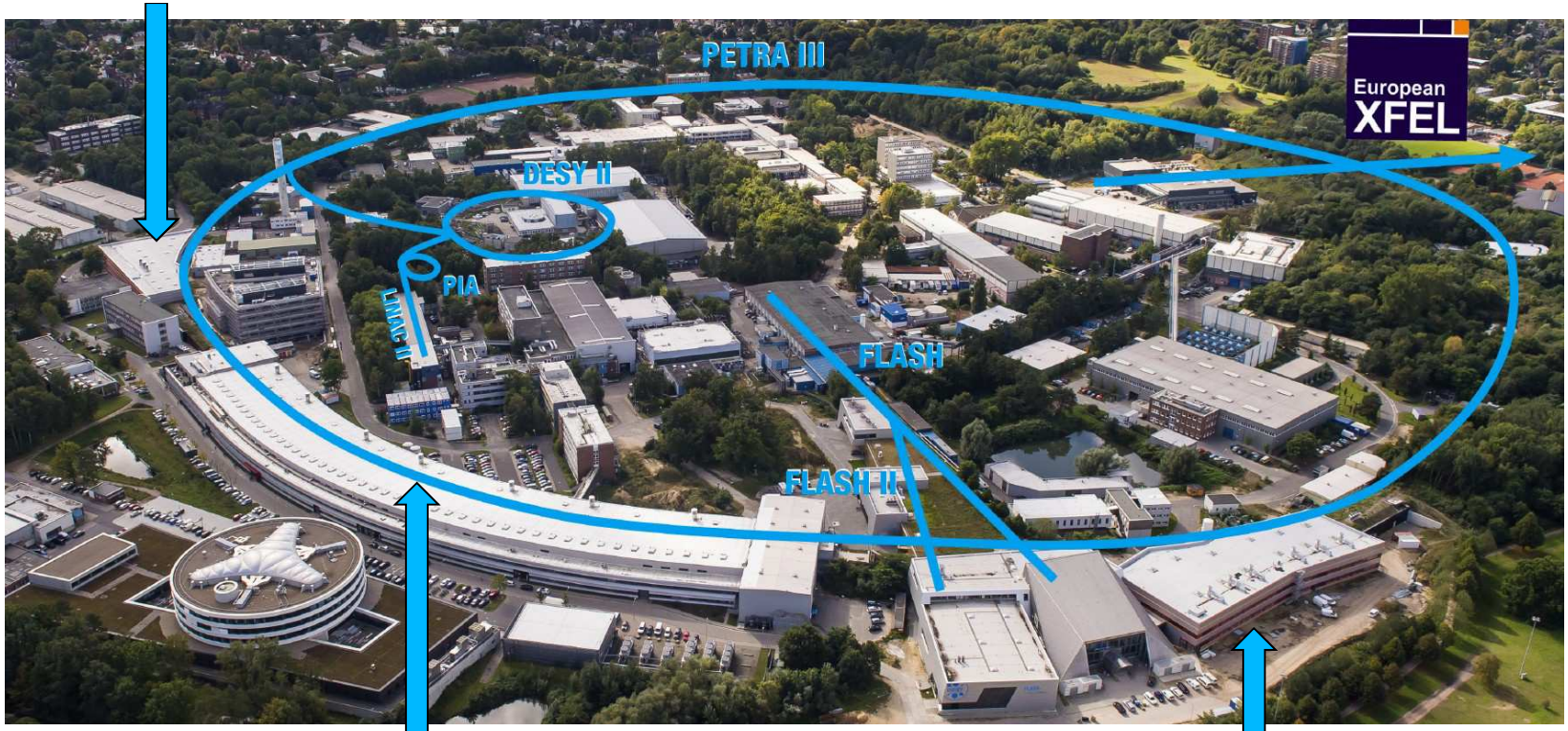
Travemünde, Feb 19, 2018

HELMHOLTZ RESEARCH FOR GRAND CHALLENGES

DESY

# PETRA III Overview

Extension Hall East
Ada Yonath  3 beam lines **(~ 3 free slots, status 2017)**




Max von Laue Hall
14 beam lines

Extension Hall North
Paul P. Ewald
2 beam lines
**(3 free slots)**

# Beam Lines: Extension Phase 3

| Number | ID Type | Energy range (keV) | Cell |
|---|---|---|---|
| **PXE** | | | |
| P21 | 4 m U21 (IV) | 40 -150 | |
| | 2 m U29 | 52, 85, 100 | |
| P22 | 2 m U33 | 2.4 - 15 | 1 |
| P23 | 2 m U32 | 5 - 35 | 1 |
| P24 | 2 m U29 | 8, 15 - 44 | 2 |
| P25 | | | 2 |
| **PXN** | | | |
| P61 | **10 x 4 m Wiggler** | 40 - 200 | |
| P62 | | | 1 |
| P63 | | | 1 |
| **P64** | **2 m U33** | **4 - 44** | **2** |
| **P65** | **0.4 m U33** | **4 - 44** | **2** |
| P66 | **Dipole** | 4 eV - 40 eV | |

Phase 2

**2017: installation of a chicane, and front end components**

2018 installation of undulators

**2017: installation of undulators**

front end components installed in 2015/16

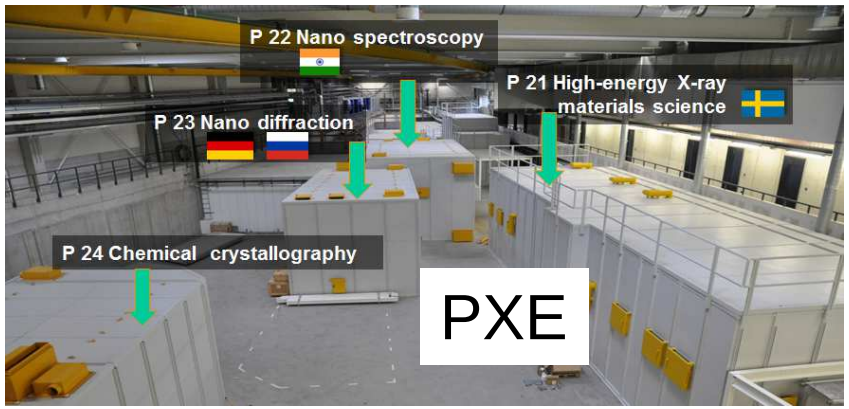
Phase 3

wiggler beam line

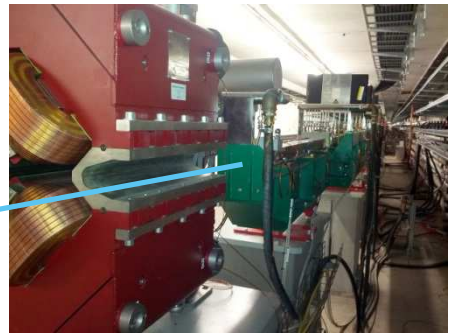
Phase 1

P64, P65 installed in 2015

P 65 external users from June 2016




beam line P61



# PETRA III shut down activities

**Winter 2017/18:**

FS-BT beam line P21
Installation of a temporary undulator P21b
In-Vacuum Undulator P21
Installation and back out of IVU

Preparation for P61 (bolts for the supports)

**18 bit PSC**

**New kicker pulser**

**one additional BPM (IVU)**

**Sommer 2018:**
Wiggler Beamline P61
alignment P61
installation of new absorber P61
Tunnel frontend P61 1&2

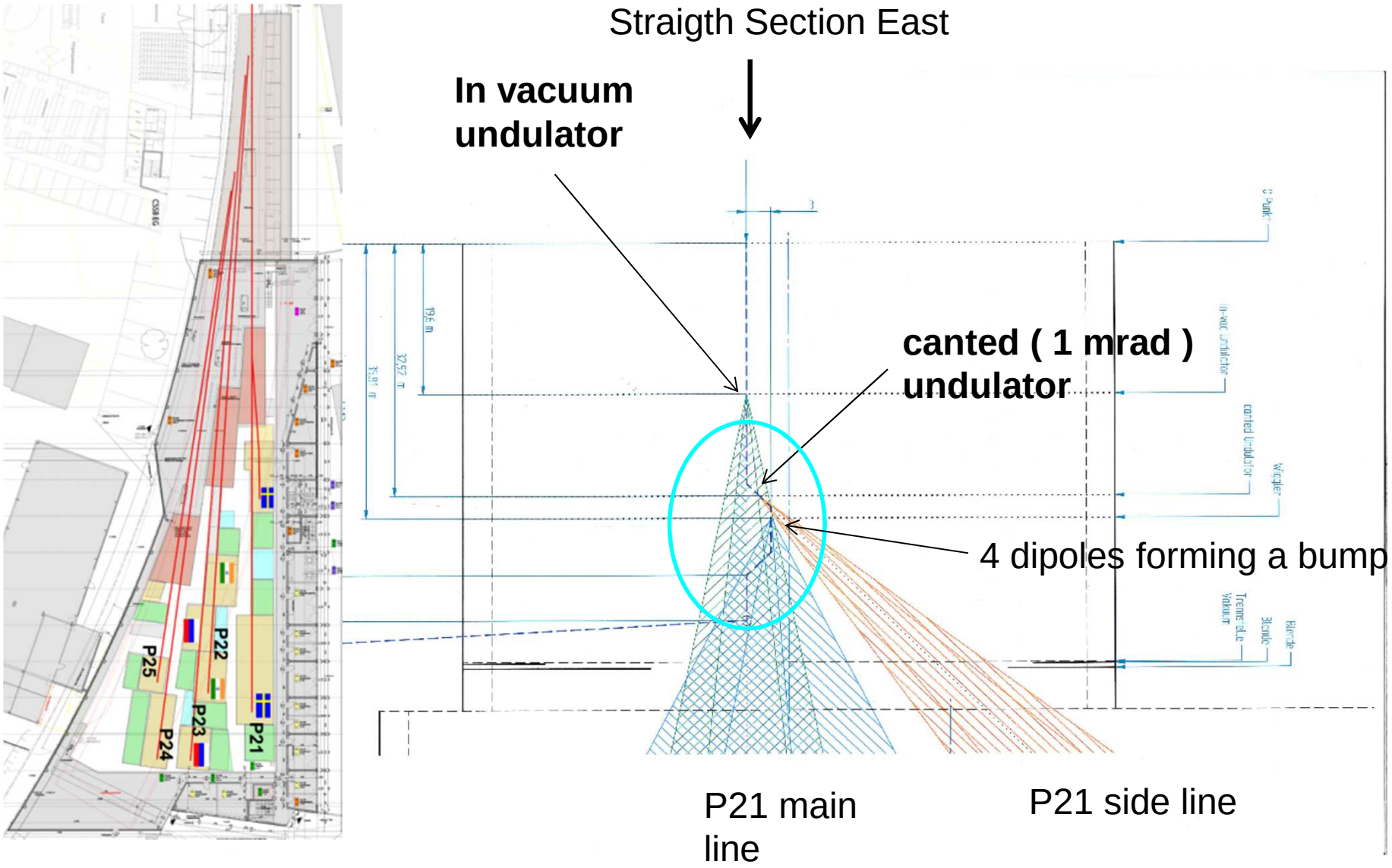
In-Vacuum Undulator P07 ???

Test for PETRA IV, NEG chambers
installation of NEG coated dipol chambers

# Installation of Undulators 2018

## P21a and P21b

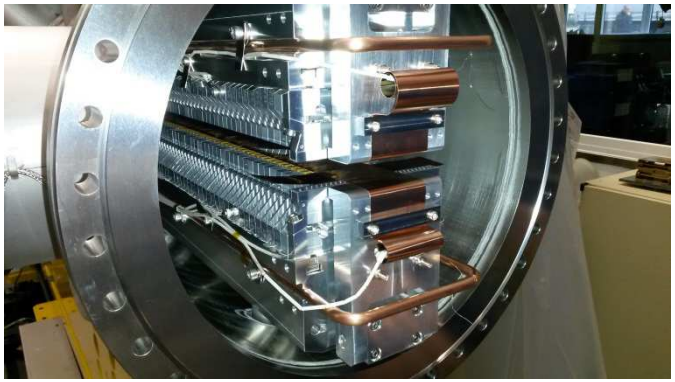

# Undulators P21a and P21b

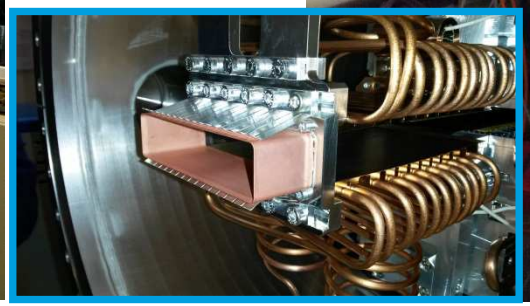


# New Beamline P21 a + b

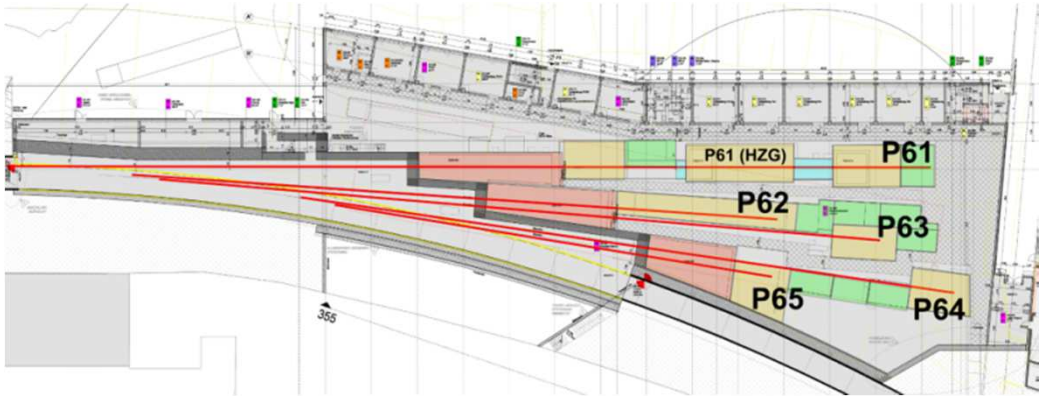
## Front end components and In-Vacuum Undulator

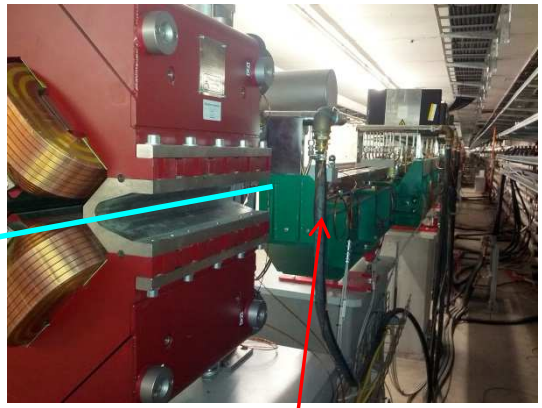
Talks by Horst Schulte-Schrepping
and Markus Tischer





# Wiggler beam line P61 (summer 2018)



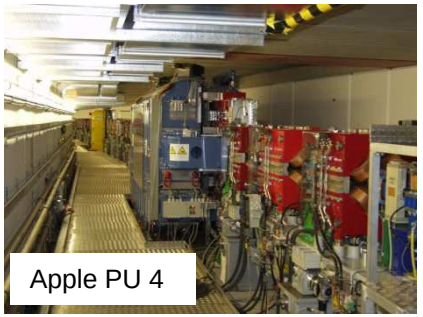
To beam line P61

Installation of a new absorber is planed in summer 2018

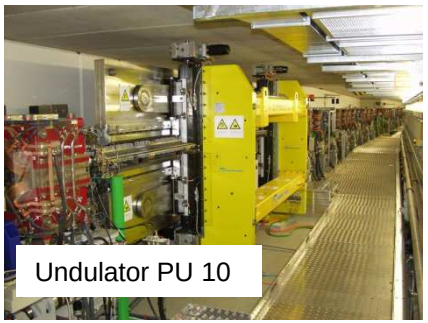
# Beam Lines: Max von Laue Hall

| Number | ID Type | Energy range (keV) | Cell |
|---|---|---|---|
| P01 | 10 m U32 (2 x 5 m) | 5 – 40 | |
| P02 | 2 m U23 | 20 – 100 | 1 |
| P03 | 2 m U29 | 8 – 25 | 1 |
| P04 | 4 m U65 (APPLE) | 0.2 – 3.0 | **2** |
| P05 | 2 m U29 | 8 – 50 | 3 |
| P06 | 2 m U32 | 2.4 – 50 | 3 |
| P07 (option low beta) | 4 m U19 (IV) (pres. 2m) | 50 – 300 | **4** |
| P08 | 2 m U29 | 5.4 – 30 | 5 |
| P09 | 2 m U32 | 2.4 – 50 | 5 |
| P10 | 5 m U29 | 4 – 25 | **6** |
| P11 | 2 m U32 | 8 – 35 | 7 |
| P12 | 2 m U29 | 4 - 20 | 7 |
| P13 | 2 m U29 | 5 – 35 | 8 |
| P14 | 2 m U29 | 5 - 35 | 8 |

**In vacuum undulator winter 2018/19**


Apple PU 4


Undulators PU 8 & PU 9


Undulator PU 10

Beam size:
150 µm x 6 µm
(high beta)

Orbit stability requirement:

submicron
~ 0.6 µm
(vert.)

| |
|---|
| High $\beta_x$ |
| Low $\beta_x$ |

High beta: $\beta_x$ = 20 m $\beta_y$ = 4 m
Low beta : $\beta_x$ = 1.4 m $\beta_y$ = 4 m

Max von Laue Hall: 14 beam lines
8 DBA cells ( length 23 m)

# PETRA III Schedule 2018

## User Run: 26. März – 17 Juli + 3. Sept. - 20. Dez. 2018

| Dez. 2017 | 2018 | Januar 2018 | Februar 2018 | März 2018 | April 2018 | Mai 2018 | Juni 2018 | 2018 | Juli 2018 | Aug. 2018 | Sep. 2018 | Okt. 2018 | Nov. 2018 | Dez. 2018 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| . 40 | 1 | | a c # BO61 | IB | | | | 1 | | f61 cc # VN N | | | | | 1 |
| . 40 | 2 | # | a c # BO61 | IB | | no MDT | | 2 | | f61 cc # VN N | | | | | 2 |
| . 40 | 3 | # | | | | | | 3 | | f61 cc # VN N | . MTRC | no MDT | | | 3 |
| . 40 | 4 | # | | | MDT # | | # | 4 | MDT # | | . MTRC | | | | 4 |
| . 40 | 5 | # | c # | IB | | | # | 5 | | | . MTRC no MDT | | | MDT | 5 |
| MDT | 6 | | c # | IB | | | | 6 | | f61 cc # | . MTRC | | | | 6 |
| . 40 | 7 | | c # | IB | | | | 7 | | f61 cc # | . MTRC | | MDT # | | 7 |
| . 40 | 8 | a b # | c # | IB | | | | 8 | | f61 cc # | | # | | | 8 |
| . 40 | 9 | a b # | c # | IB | | MDT # | | 9 | | f61 cc # | | # | | | 9 |
| . 40 | 10 | a b # | | | | | SRI18 | 10 | | f61 cc # | | # | | | 10 |
| . 40 | 11 | a b # | | | MDT | | SRI18 | 11 | MDT | | | # | | | 11 |
| . 40 | 12 | a b # | IMv | d IB | | | SRI18 | 12 | | | MDT # | | bb # | MDT # | 12 |
| MDT | 13 | | IEv | d IB | | | MDT SRI18 | 13 | | f61 cc IP61 # | | | bb # | | 13 |
| . 40 | 14 | | IEv | d IB | | | SRI18 | 14 | | f61 cc IP61 # | | | bb # | | 14 |
| . 40 | 15 | a c # | NG IEv | e so seM | | | SRI18 | 15 | | IB | | | bb # | | 15 |
| . 40 | 16 | a c # | NG IEv | e so seM | | MDT | | 16 | | IB | | | bb | | 16 |
| . 40 | 17 | a c # | | | | | | 17 | | IB | | MDT | | | 17 |
| . 40 | 18 | a c # | | | MDT # IP21v | | | 18 | V61 K61 f61 cc # | | | | | | 18 |
| . 40 | 19 | a c # | NG IEv | e so seM | | | | 19 | V61 K61 f61 cc # | | MDT | | | no MDT | 19 |
| MDT | 20 | | NG IM | e so seM | | | MDT # | 20 | V61 K61 f61 cc # | IB | | | | | 20 |
| . 40 | 21 | | NG IM | MDT # | | | | 21 | | IB | | | MDT | Shutdown | 21 |
| . 40 | 22 | a c # VV61 | NG IE | e so seM | | | | 22 | | IB | | | | Shutdown | 22 |
| Shutdown | 23 | a c # VV61 | NG IE | e so seM | IP21 # | MDT # | | 23 | V61 K61 f61 cc # | IB | | | | Shutdown | 23 |
| Shutdown | 24 | a c # VV61 | | | IP21 # | | | 24 | V61 K61 f61 cc # | IB | | MDT # | | Shutdown | 24 |
| Shutdown | 25 | a c # VV61 | | | IP21 # | | | 25 | f61 cc # VN N | | | | | Shutdown | 25 |
| Shutdown | 26 | a c # VV61 | NG IE | . seM | IP21 Prüfung | | | 26 | f61 cc # VN N | | MDT # | | | Shutdown | 26 |
| Shutdown | 27 | | NG IE | . seM | | | MDT | 27 | f61 cc # VN N | IB | | | | Shutdown | 27 |
| Shutdown | 28 | | NG | MDT | | | | 28 | | IB | | | MDT # | Shutdown | 28 |
| Shutdown | 29 | a c # BO61 | | . seM | | | | 29 | | dd e | | | | Shutdown | 29 |
| Shutdown | 30 | a c # BO61 | | | | MDT | | 30 | f61 cc # VN N | dd e | | | | Shutdown | 30 |
| Shutdown | 31 | a c # BO61 | | | | | | 31 | f61 cc # VN N | dd e | | MDT | | Shutdown | 31 |

| | | | |
|---|---|---|---|
| | set-up / test run | | |
| | service week | | |
| | user run | | school holiday HH |
| | machine development time | | |
| | Sunday / holiday | | school holiday SH |

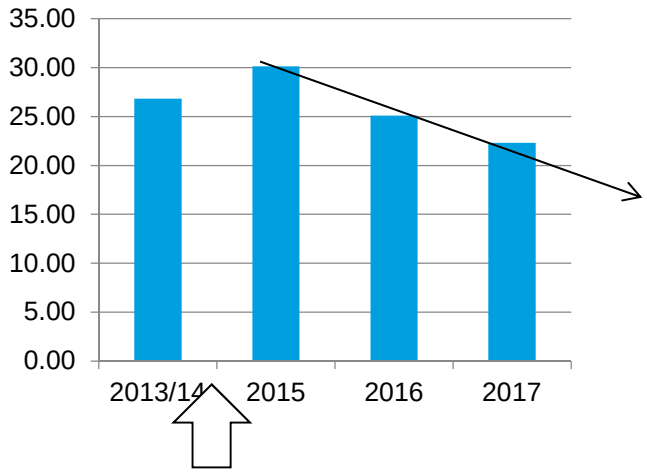
# PETRA III – Availability

## Goal 2018

**2017**

**Availability 98 %**
**MTBF 42.5 h**
**(without warm up time)**

**Faults / 1000 h**




1 year shut down
implementation of the extension

**2018**
Target:
Availability >98 %
MTBF ~ 60 h

How it could work:
faults / 1000 h

| | 2017 → 2018 | |
|---|---|---|
| RF: | 5.5 → 5.0 | 0.5 |
| PS: | 4.3 → 2.9 | 1.4 |
| EXP: | 2.5 → 0.8 | 1.7 |
| OP: | 1.8 → 0.7 | 1.1 |
| Timing: | 1.0 → 0.3 | 0.7 |
| Feedback: | 1.0 → 0.3 | 0.7 |
| | | **6.1** |

22.3 – 6.1 = 16.2

Thank you for your attention !