

XFEL High Power RF Status

S. Choroba, V. Vogel, V. Katalev, T. Grevsmühl, H. Leich, R. Wenndorff, W. Köhler, L. Jachmann, T. Frölich, I. Sokolov, R. Wagner, I. Sandvoss, H.-J. Eckoldt, M. Penno, N. Poggensee, A. Brüsewitz, J. Hartung, F. Eints

RF High Power Source

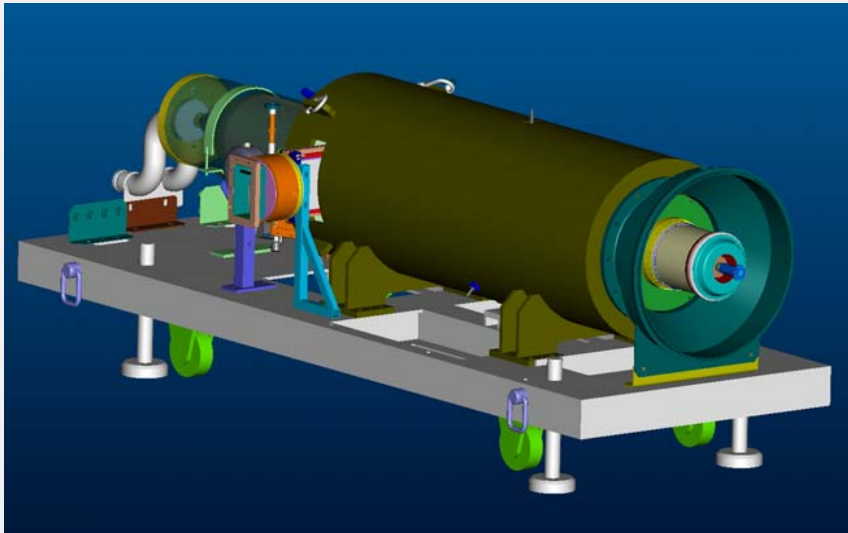
- 8 THALES TH1801 have been built, the last one has been tested successfully recently
- Prototype had been in use at Flash, now stored at DESY
- #1 and #4 in use at PITZ
- #2 did not pass acceptance test some years ago, will be rebuild as #8
- #3 has been in use at FLASH, failure after 17000h gun arcing
- #5 in use at FLASH
- #6 passed acceptance test at Thales, passed acceptance test at DESY
(10MW, $\eta=61\%$)
- #7 passed acceptance test at Thales, passed acceptance test at DESY
(10.5MW on matched load, $\eta=62\%$)
- 1 TOSHIBA E3736 at DESY
 - 10.4MW, 1.5ms, 10Hz, 66%
 - 750h, ~80% at full power
 - will be used at the modulator test stand in Zeuthen
- 1 CPI VKL8301 at DESY
 - 8.1MW, 1.3ms, 10Hz, 53.5% in use at CMTB at DESY

RF High Power Source

Horizontal MBK prototypes

- Horizontal versions of MBKs by all 3 vendors are under construction (THALES, TOSHIBA, CPI)
- First klystron has been tested at DESY (Toshiba, December 07 to February 08)

THALES TH1802



Thales horizontal MBK

Status

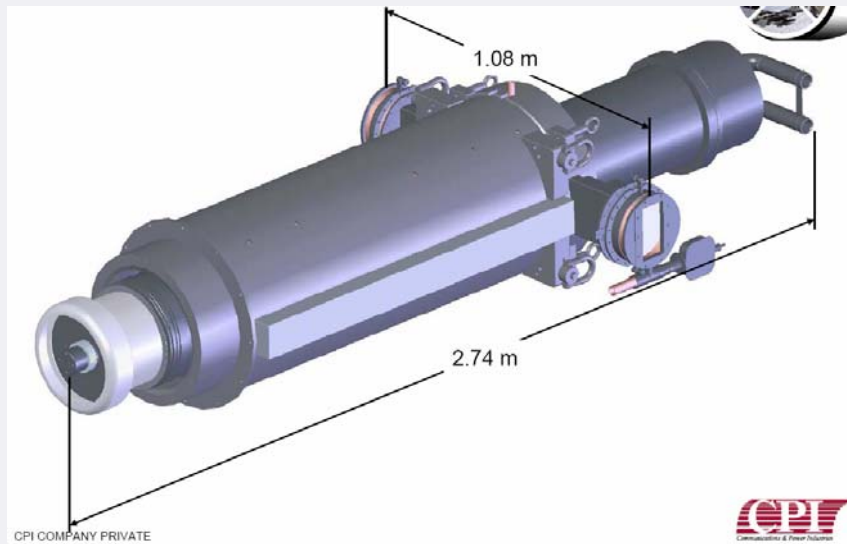
- achieved 10.1MW, $\eta=63\%$ full pulse length in vertical test
- vacuum leak opened during test in horizontal position at output waveguide
- now being rebuild at Thales
- FAT planned for February 09



CPI horizontal MBK

Status

- tube is baked
- delayed due to delayed delivery of solenoid to CPI



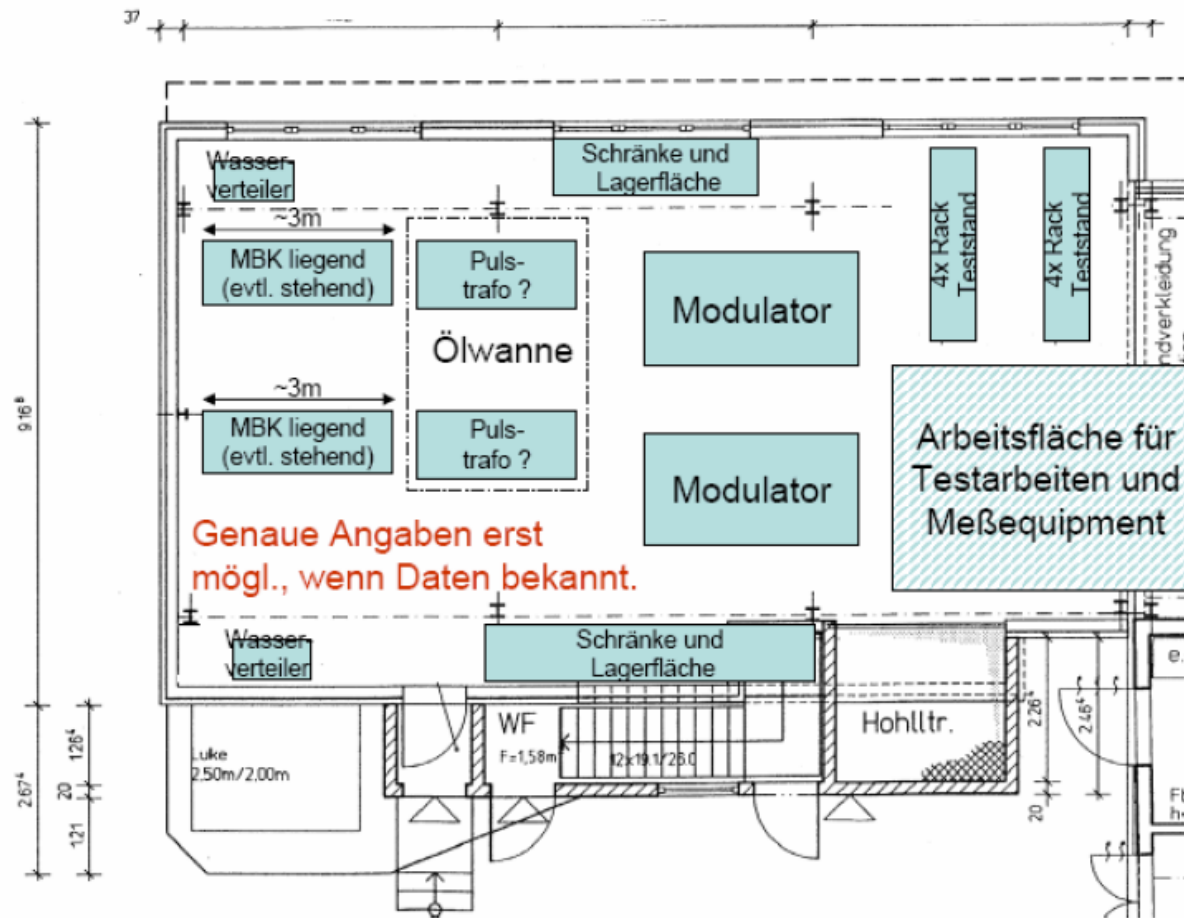
CPI horizontal MBK

- Conditioning has just started
- FAT at CPI is planned for January 09



Modulator

Modulator Test Facility at DESY in Zeuthen

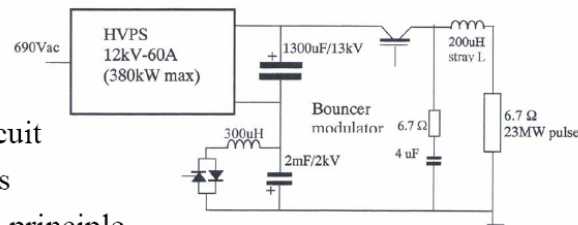


Modulator

Qualification of additional vendors

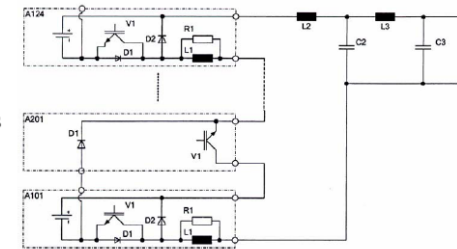
Bouncer Modulator by Imtech/Vonk

- Bouncer Type, as specified by DESY
 - 12kV HVPS
 - Bouncer 300uH/4.6kA
- 7st IGCT main switch
- Digital Regulation Circuit
- Analog In- and Outputs
- Well known and tested principle
- delivery time: 12 month



PSM Modulator by Thomson BM

- Different Type:
 - 12kV/2kA w. transformer
 - Pulse Width Modulation
 - 24 switching stages in series
 - FPGA based control
 - 2 stages for redundancy
- Slew rate and pulse shape controllable
- detailed description available, principle already successfully tested (worldwide, i.e. W7/X)
- delivery time: 14 month

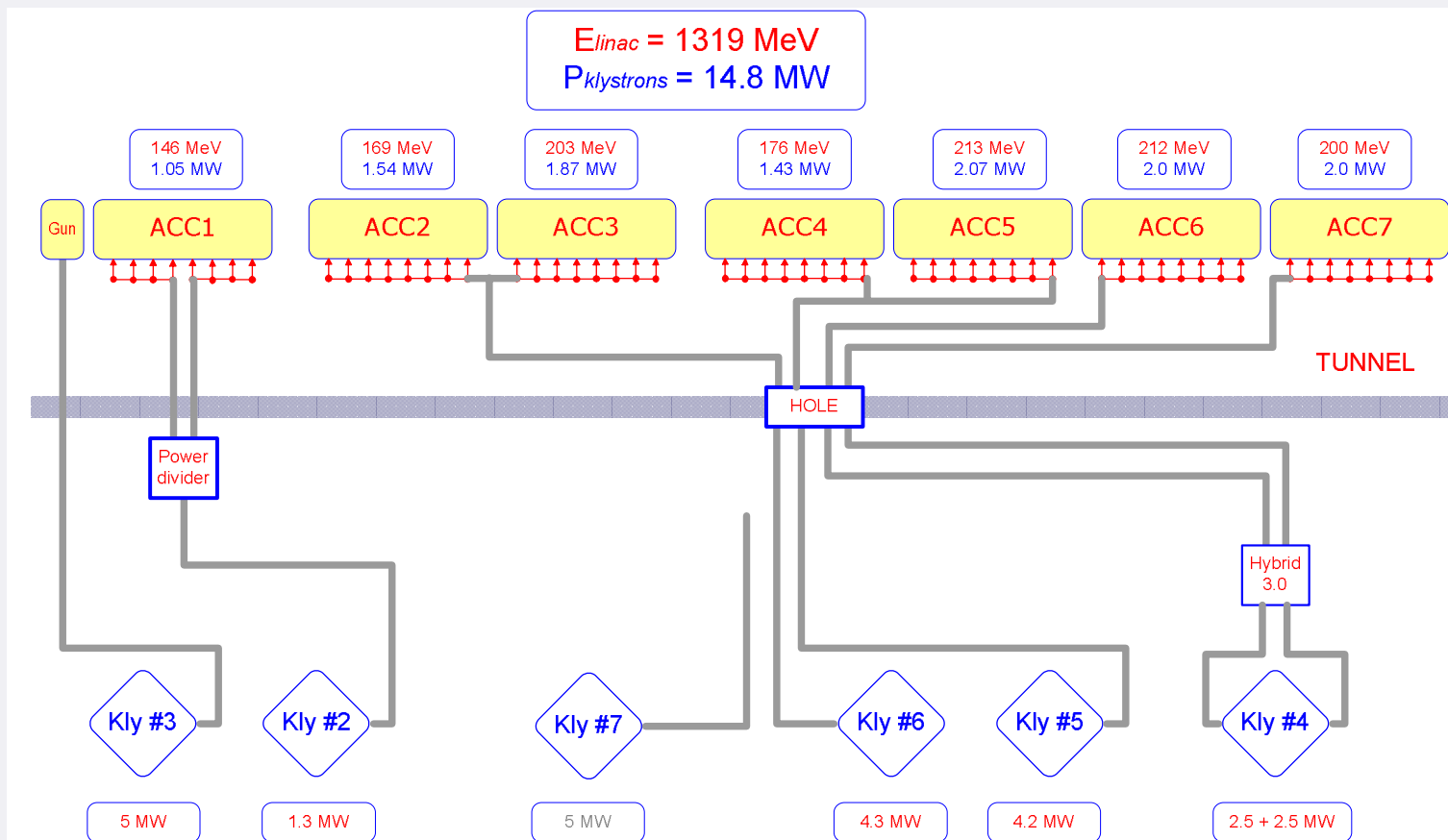


- Thomson BM has been received at DESY in summer 08, installation and commissioning has been finished in October 08, test has just started
- Imtech/Vonk not before spring 09

Thomson modulator at DESY in Zeuthen



New FLASH waveguide distribution after 2009 Shutdown



5MW Klystron
(10MW MBK in
future)

5MW
Klystron

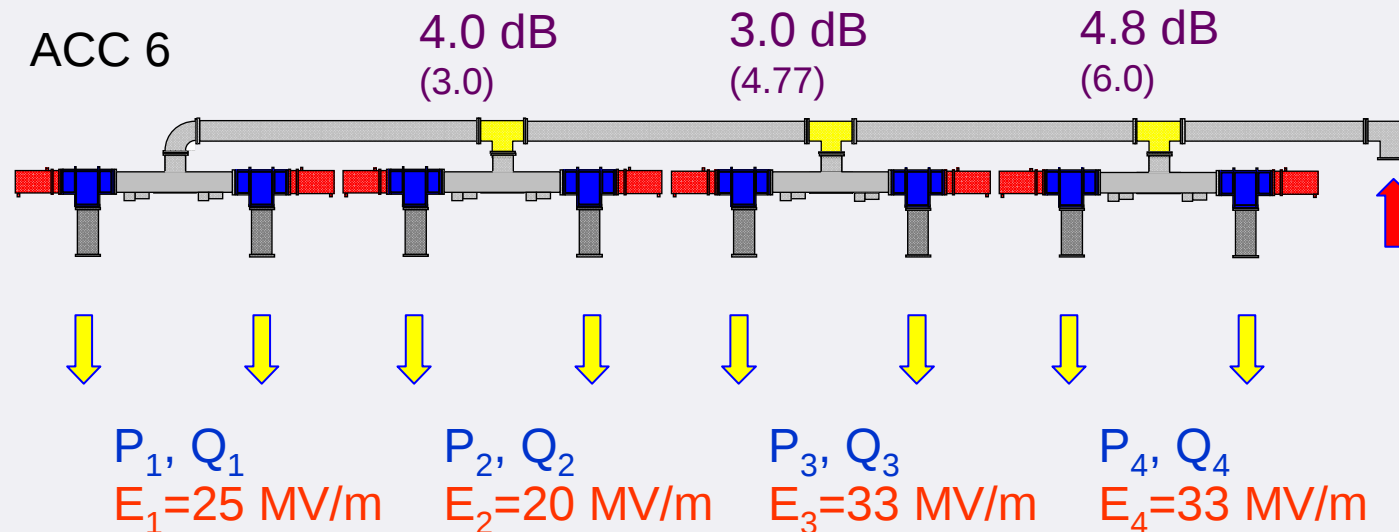
not existing

5MW
Klystron

5MW
Klystron

10MW
MBK

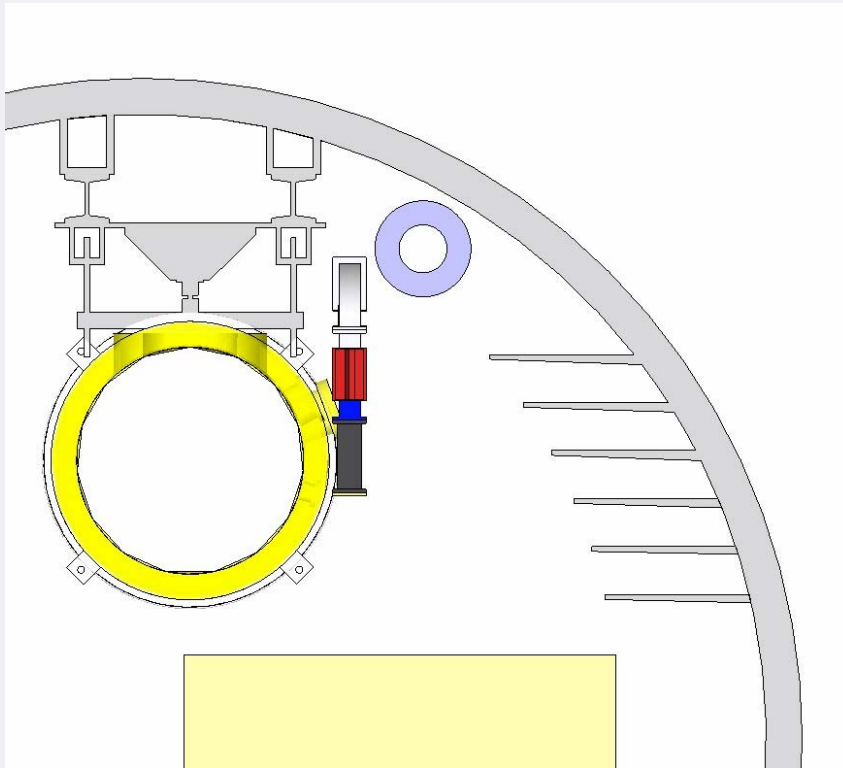
FLASH Shutdown 2009



- ACC7 will get similar XFEL distribution as ACC6
- For the RF gun another parallel waveguide will be installed for operation with 10MW MBK in the future
- Several other waveguide distribution modifications
- 2 new RF stations will replace old fermilab stations
- Fermilab stations will be used for XFEL WATF

Waveguide Distribution

Waveguide in the XFEL Tunnel



XFEL type distribution at FLASH