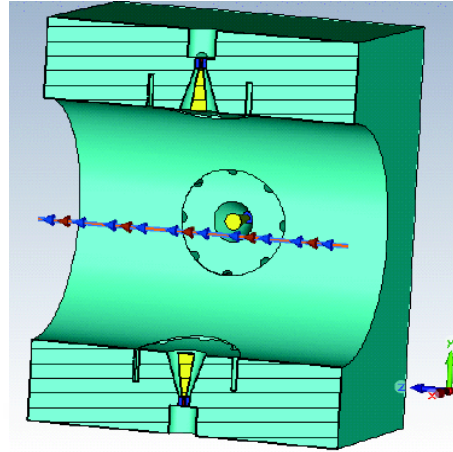
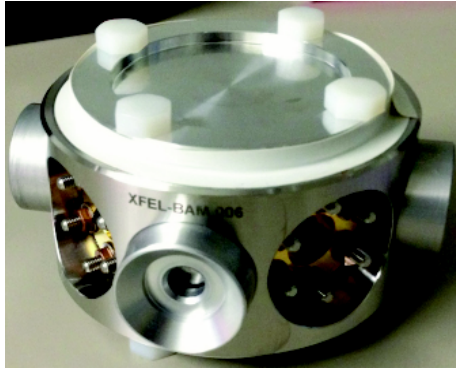


New Bunch Arrival Time Monitor for FLASH and XFEL.



Hannes Dinter

New Bunch Arrival Time Monitor for FLASH and XFEL

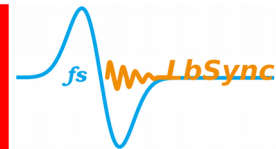
3rd ARD Topical Workshop

Subtopic 3 "ps – fs Electron and Photon Beams"

KIT, Karlsruhe, 15. - 17. July 2015



TECHNISCHE
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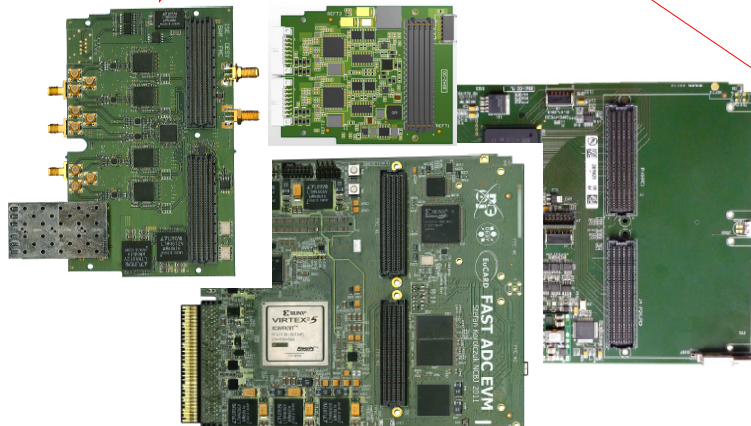
BAM : General Layout

- BAM = Bunch Arrival Time Monitor
- measurement of electron bunch timing with femtosecond resolution (< 10 fs)
(relative to optical timing reference)
- complex system, comprises 3 sub-units:

- RF Unit (broad-band up to 40 GHz)
- Electro-Optical Unit
- Electronics

(read-out, control, general I/O, ...)

FMC25 + DSBAM
FMC20 + MD22 (2x)



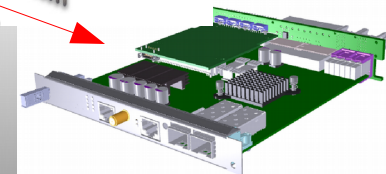
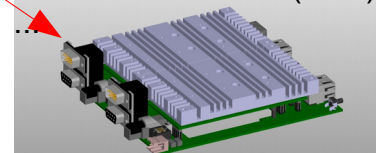
40 GHz pick-up
design by TU Darmstadt,
housing made by DESY



Electro-Optical Modulator
Telecomm. standard → 40 Gbps
Intensity Modulator



TMCB2
Temp. controller
Laser-Diode Driver (LDD)



BAM : Components

RF Unit

- RF pickup
- low-loss, phase-stable cables
- power combiner
- power limiter (50 GHz BW)
- optional power amplifier
- optional attenuator, voltage-controlled

EO Unit

- connected to stabilised fibre link (fs synchronisation system)
- 2x motorised, optical delay line
- 1x motorised (static) optical delay
- 2x electro-optical modulators: 20 GHz and 40 GHz BW
- optical switch (100 ns rise-time)
- diverse, polarisation maintaining fibre-optical components
 - circulator
 - combiner/splitter
 - optical amplifier
 - optical power coupler

Electronics

- MTCA.4
 - FMC25 + DSBAM
 - FMC20 + 2x MD22
- TMCB2 + backplane
- FRED
- LDD (1 channel)
- temperature controller
- optional fan control
- optical switch control

BAM Box :
19" module, 4U, 530 mm depth

