

FLASH.

Free-Electron Laser FLASH



Beamtime preparation questionnaire

Please, take the time to fill in this form. The more accurate you answer these questions, the better we can prepare for your beamtime.

PI name:	Experiment:	Beamtime application ID:
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1. Standard diagnostics

The main photon diagnostics are always provided at FLASH and are always stored pulse train synchronously in the DAQ system:

- Beamline parameters (Aperture positions, Fast shutter state, Filter settings, mirror and screen positions , PG2 settings, attenuator pressure ...)
- XUV properties (pulse energy, beam position, number of electron bunches per bunch train,...)
- Electron properties (electron arrivaltime (BAM), electron bunch energy, electron bunch charge, ...)
- Pump Probe laser properties (PPlaser delay, synchronization state, dipole-laser delay(streak camera, ...)

Further information:

Most popular FLASH parameters: [Link](#)¹ FLASH DAQ system: [Link](#)² FLASH photon diagnostics: [Link](#)³

For more specific questions, please ask your local contact.

2. Additional diagnostics

These photon diagnostics are provided on request. Please consult your local contact. The data will be stored in the DAQ system.

I need these additional diagnostics:

- Online spectrum at FLASH1 –BL beamlines: VLS ([Link](#)⁴)
- Online spectrum at FLASH2: OPIS ([Link](#)⁵)
- Wave front sensor (can be installed at any FLASH beamline) ([Link](#)⁶)
- Electron bunch profile monitor: LOLA ([Link](#)⁷)
- I have discussed this with my local contact.

3. ADCs and amplifiers

These types of ADCs are available at each beamline. The input AC impedance is 50 Ω for all types. Please insert the number of channels you need.

# of required channels	Max # of available channels	Need DAQ? (Mark with 'x')	Range	Sampling Rate	Resolution
	4		800 mV pp	2 GS/s	12 bit
	2		800 mV pp	4GS/s	12 bit
	4		-1V..+1V	125MS/s	16 bit

If you need an amplifier for small signals or for decoupling, please talk to your local contact.

More detailed information about ADCs and amplifiers: [Link⁸](#)

4. Triggers

We provide trigger signals to enable the users to synchronize their experiments to the FLASH pulse trains. The MTCA based triggers have a jitter in the few ps range, the delay can be shifted in 1 ns steps (over many ms). One can choose between 10 Hz triggers, frequencies locked to the pulses (e.g. 1MHz), and the actual bunch patterns.

More detailed information about Triggers: [Link⁹](#)

5. Cameras

You can bring your own camera or borrow one at FLASH. If you want to control the camera via DOOCS and/or store the camera images and settings in the DAQ, you should use a camera that complies with the GenIcam standard, preferably with an Ethernet interface. Many of the current camera models comply with this standard.

- I want to bring my own camera. Model: _____
- I want to use a camera supplied by FLASH (Please give details in CommentsComments).
- I want to control the camera via DOOCS.
- I want the images and camera settings to be stored in the DAQ system.

More detailed information about Camera Servers: [Link¹⁰](#)

6. Detectors

Detectors for different purposes are available at FLASH, e.g. a pnCCD camera, a wave front sensor, or an electron spectrometer and some more. Please consult your local contact.

- I want to use this detector supplied by FLASH: _____
 - I have discussed this with my local contact.
- I bring my own detector (Please, give details in Comments)

- I store the data on my own (not in the DAQ)
 - I want to store the data in the FLASH beamline file system (GPFS)
 - I need pulse train synchronization.
 - I know how to do that.
 - I need assistance concerning
 - Software
 - Trigger signals
 - Train ID
 - I would like to store the data in the DAQ system, if possible.

7. Computing

User consoles

In addition to the control computers located at the experiments, FLASH provides analysis computers that can be borrowed on short notice (“user consoles”). These standard desktop PCs are prepared to be used for beamline control via jddd. Each console is provided along with a mouse, a keyboard and a monitor. We provide Linux and Windows user consoles with these sets of software installed (only most important ones shown):

Windows 10 (64 Bit):

- | | |
|---------------------|---|
| • Anaconda3 | • Putty |
| • Fast X2.0 | • X-Win32 2018 |
| • OpenJDK 12 (Java) | • Jddd |
| • Matlab R2018b | • LabView 2017/2018/2019 + Vision + selection of device drivers |
| • Microsoft Office | • GIMP 2 |
| • Origin 2018 | |

Linux (Ubuntu 16.04 x64):

- | | |
|---------------------|------------------------|
| • (i)Python 2.7 | • jddd |
| • (i)Python 3.5 | • Matlab 2013b – 2019a |
| • Jupyter notebook | • GIMP 2 |
| • Oracle Java 8 | • Fast X2 |
| • OpenJDK 12 (Java) | • Libre Office |

- I want to use _____ windows user console(s).
- I want to use _____ linux user console(s).
- I want to bring my own computer(s), networked scopes, ...
 - I need DESY network access:
 - Office network
 - Control network
 - MAC address: _____

- Operating System: _____
- If you need network access for several devices, please provide details in Comments.

I need Internet access only

Other computing resources

If you need more powerful computing resources, you have these options:

- Workstation: 2 x 6 cores @ 3.7 GHz, 128 GB RAM, 10 GBit Ethernet
- Shared node on the Maxwell cluster:
 - 2 x 10 cores @ 2.4 GHz (or similar)
 - 256 GB RAM
 - 10GBit Ethernet
 - NO access to the beamline file system (GPFS)
 - You share the node with other users
- Reserved Maxwell node(s):
 - CPUs and/or GPUs
 - WITH access to the beamline file system (GPFS)
 - You are alone on the node
 - Costly option! Please provide reasons in Comments.

More info: Beamline / core file system: [Link](#)¹¹

Maxwell cluster: [Link](#)¹²

8. Online data analysis (DOOCS format)

Data can be monitored online using jddd. If you need additional online data access for analysis in your programs, please give details:

I want to analyze these data online:

Data	Pulse train synchronized		Analyze with (mark with 'x')					
	Yes	No	Python	Matlab	Java	LabView	C++	C
Pulse energy (average)								
Pulse energy (single pulse)								
GHz ADC trace								
MHz ADC trace								
Wavelength								
BAM								
Camera data								
External detector (e.g. pnCCD)								

9. Near-online data analysis (HDF5 format)

The DAQ data can be converted to the HDF5 format near-online, that is, a few minutes after recording. These files are to be used with the Beamtime DAQ access libraries for Matlab or Python.

I need near-online HDF5 conversion of the DAQ data.

More detailed information about the Beamtime DAQ access libraries: [Link](#)¹³

10. After beamtime data analysis (HDF5 format)

The DAQ data can be converted to the HDF5 format after the beamtime. These files are a bit more convenient to use than the near-online converted HDF5 files, because they are organized by DAQ runs or hours. Moreover, the property names are less cryptic.

I want the DAQ data to be converted to the HDF5 format after the beamtime.

More detailed information about HDF5 conversion: [Link](#)¹⁴

11. Remarks

Please, come well before your beamtime actually starts!

Besides the setup of the experiment, you will also need some time to set up your DAQ and online monitoring.

Useful information for the preparation of your beamtime:

FLASH homepage: [Link¹⁵](#)

Docu for FLASH users on confluence.desy.de: [Link¹⁶](#)

12. Comments

If one of the links does not work, copy the address into your browser's address bar.

¹ <https://confluence.desy.de/display/FLASHUSER/The+FLASH+HDF5+structure#TheFLASHHDF5structure-FLASHHDF5structure>

² <https://confluence.desy.de/display/FLASHUSER/FLASH1+PhotDiag+stream>

³ http://photon-science.desy.de/facilities/flash/photon_diagnostics/index_eng.html

⁴ http://photon-science.desy.de/facilities/flash/photon_diagnostics/vls_spectrometer/index_eng.html

⁵ http://photon-science.desy.de/facilities/flash/photon_diagnostics/opis_spectrometer/index_eng.html

⁶ http://photon-science.desy.de/facilities/flash/photon_diagnostics/wavefront_sensor/index_eng.html

⁷ https://bib-pubdb1.desy.de/record/80175/files/WG511_TALK.PDF

⁸ <https://confluence.desy.de/display/FLASHUSER/MTCA+ADCs>

⁹ <https://confluence.desy.de/display/FLASHUSER/Trigger+Howto>

¹⁰ <https://ttfinfo.desy.de/FLASHWiki/Wiki.jsp?page=Camera%20server>

¹¹ <https://confluence.desy.de/display/ASAP3/ASAP3++Data+Storage+for+PETRA+III>

¹² <https://confluence.desy.de/display/IS/Maxwell>

¹³ <https://confluence.desy.de/display/FLASHUSER/Near-Online+data+analysis>

¹⁴ <https://confluence.desy.de/display/FLASHUSER/User+overview>

¹⁵ http://photon-science.desy.de/facilities/flash/index_eng.html

¹⁶ <https://confluence.desy.de/display/FLASHUSER/FS-FLASH+USER+Home>