# Day-1 operations parameters for SASE3

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SQS Early User Workshop 12.2.2018

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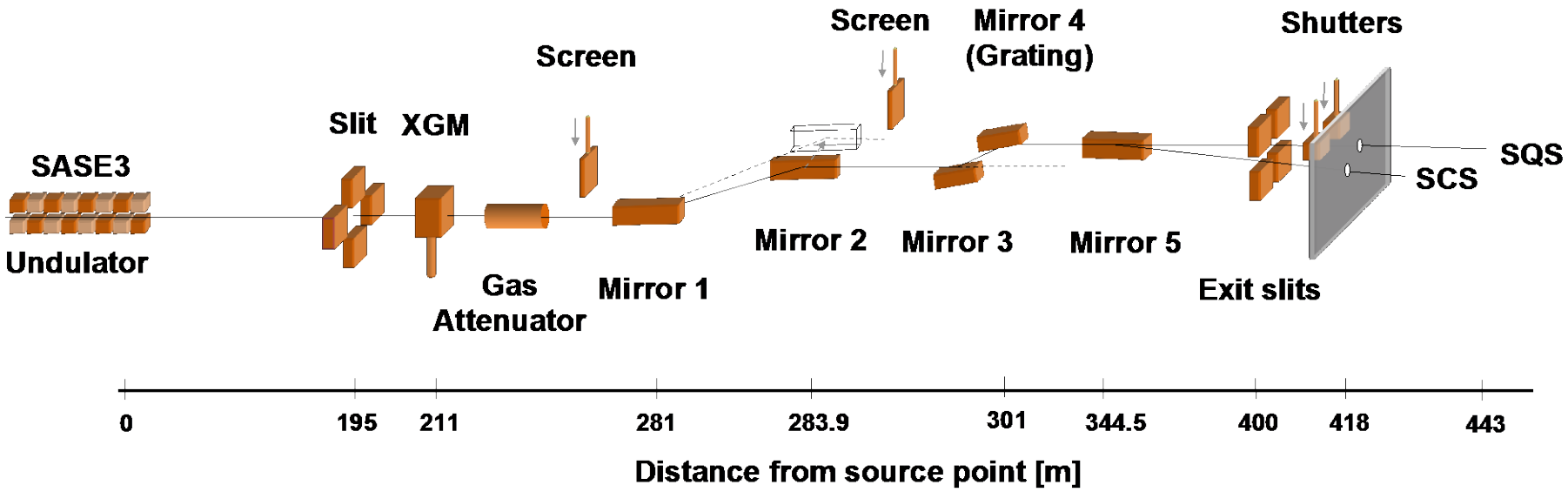
# Day-1 operations parameters for SASE3

- Electron energy 14 GeV
- Photon energy 1 keV
  (a few other fixed photon energies from 500 eV to 3000 eV possible)
- Tunability limited
- Bandwidth 0.5 % of fundamental wavelength (SASE mode)
- Monochromator can be used
- X-ray pulse duration 50 – 100 fs FWHM
- X-ray pulse energy 0.5 - 3 mJ
- Number of pulses about 300 pulses per train (i.e. 3000 per second)
- Repetition rate in train 1 MHz
- Polarization linear (horizontal)
- Focus size 1.5 – 2.5 micron (10 micron)

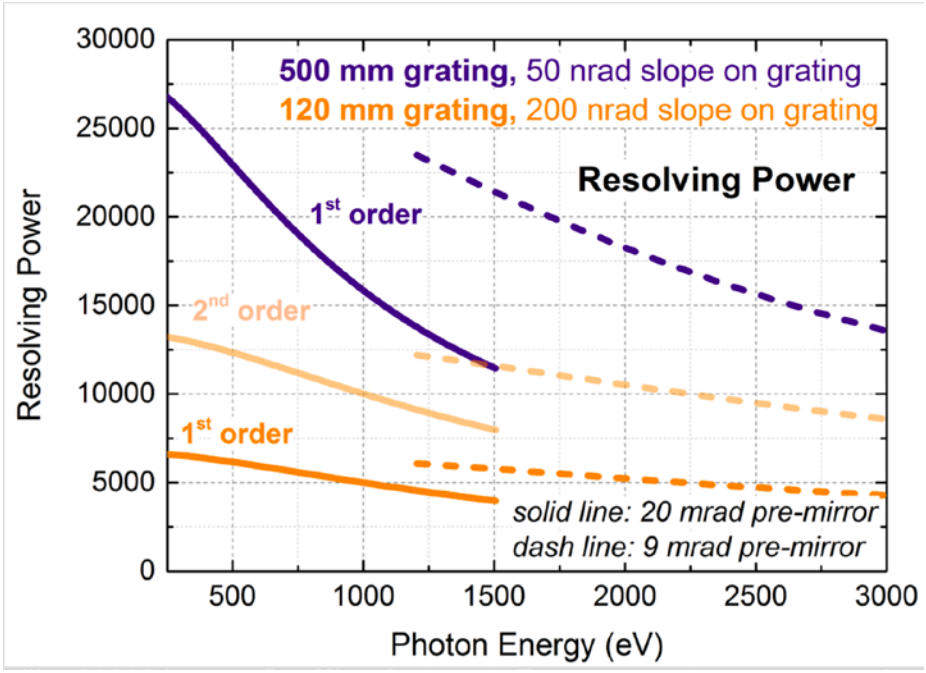
# SASE3 photon beamline layout

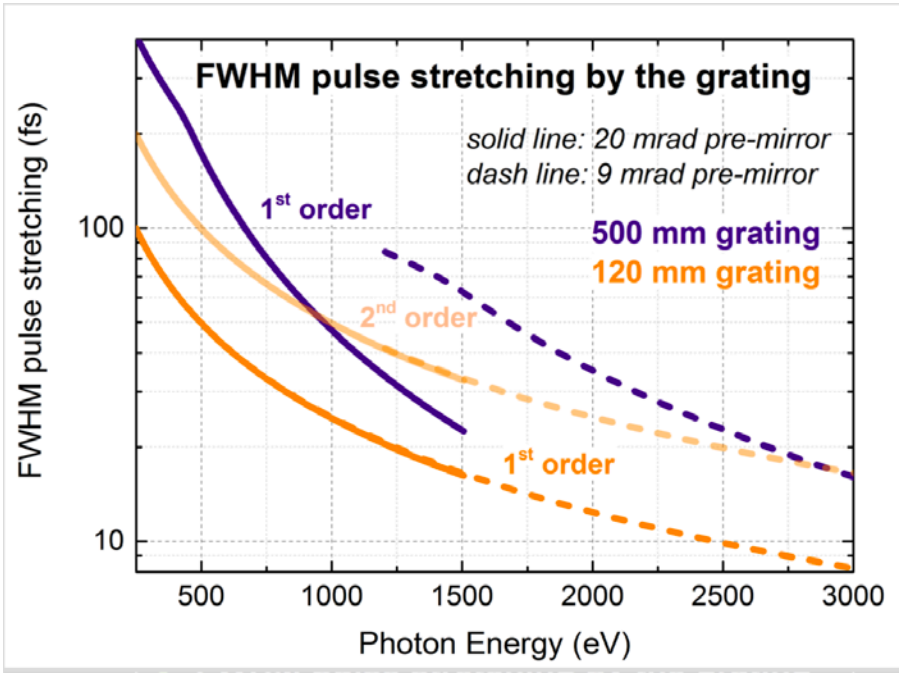



Current status:

- All mirror mounted except M5
- No cooling yet on mirrors
- Some components not yet under software control (exit slits, other components not shown..)
- Mono equiped with one short grating (50l/mm) and one long blank

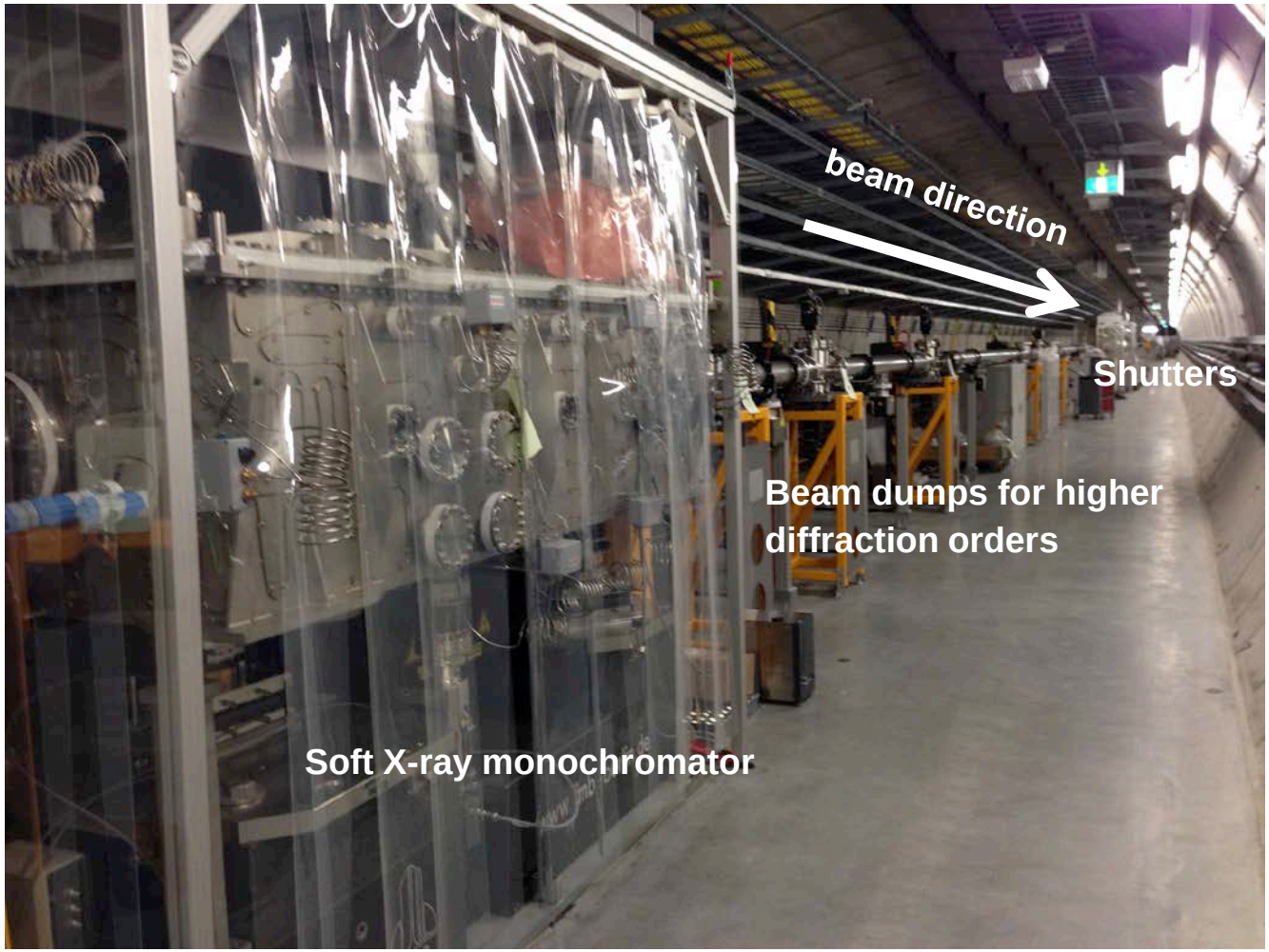
# Initial shorter grating (120 mm instead of 500 mm)



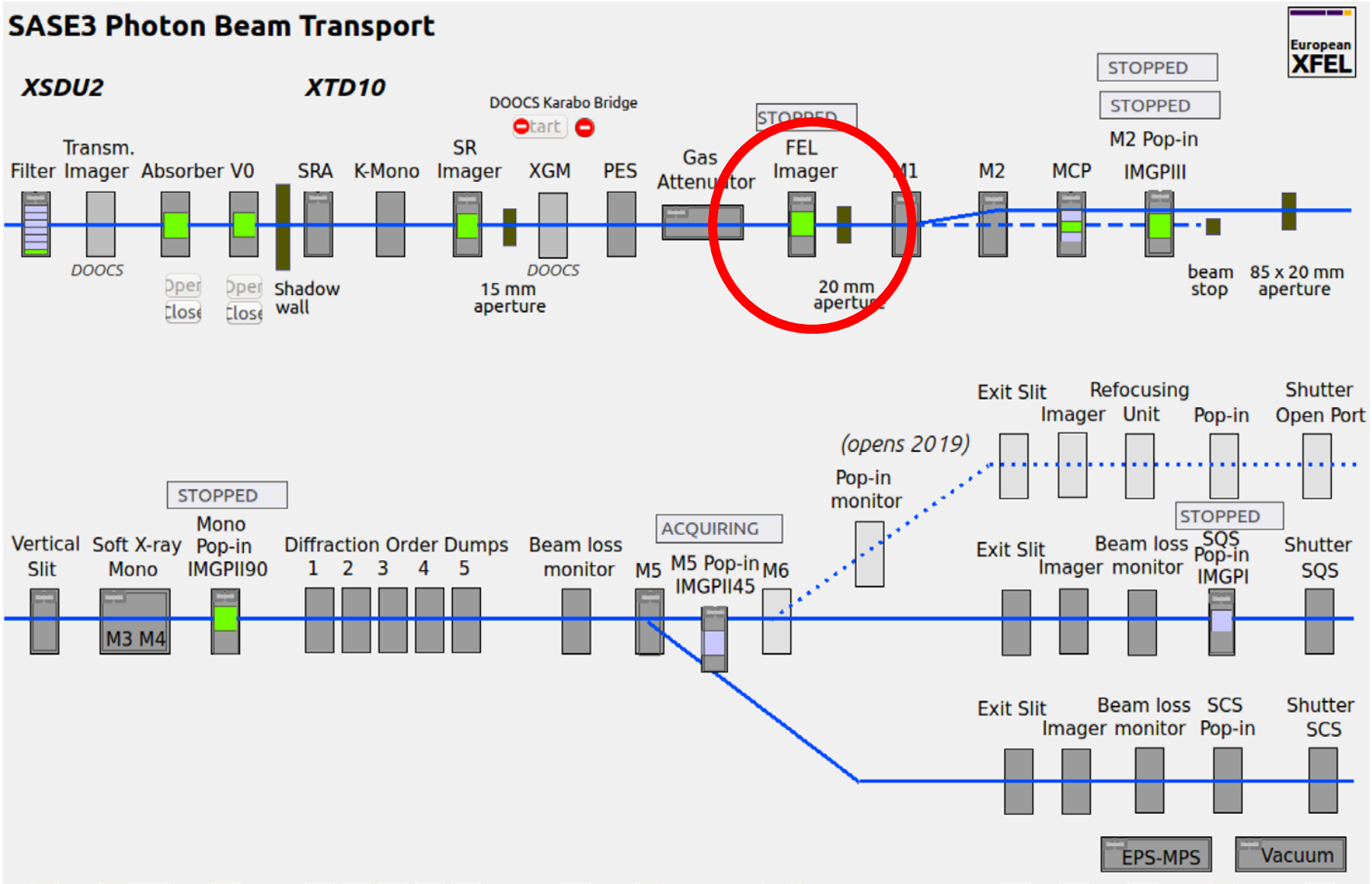




by Natalia Gerasimova, European XFEL 2018

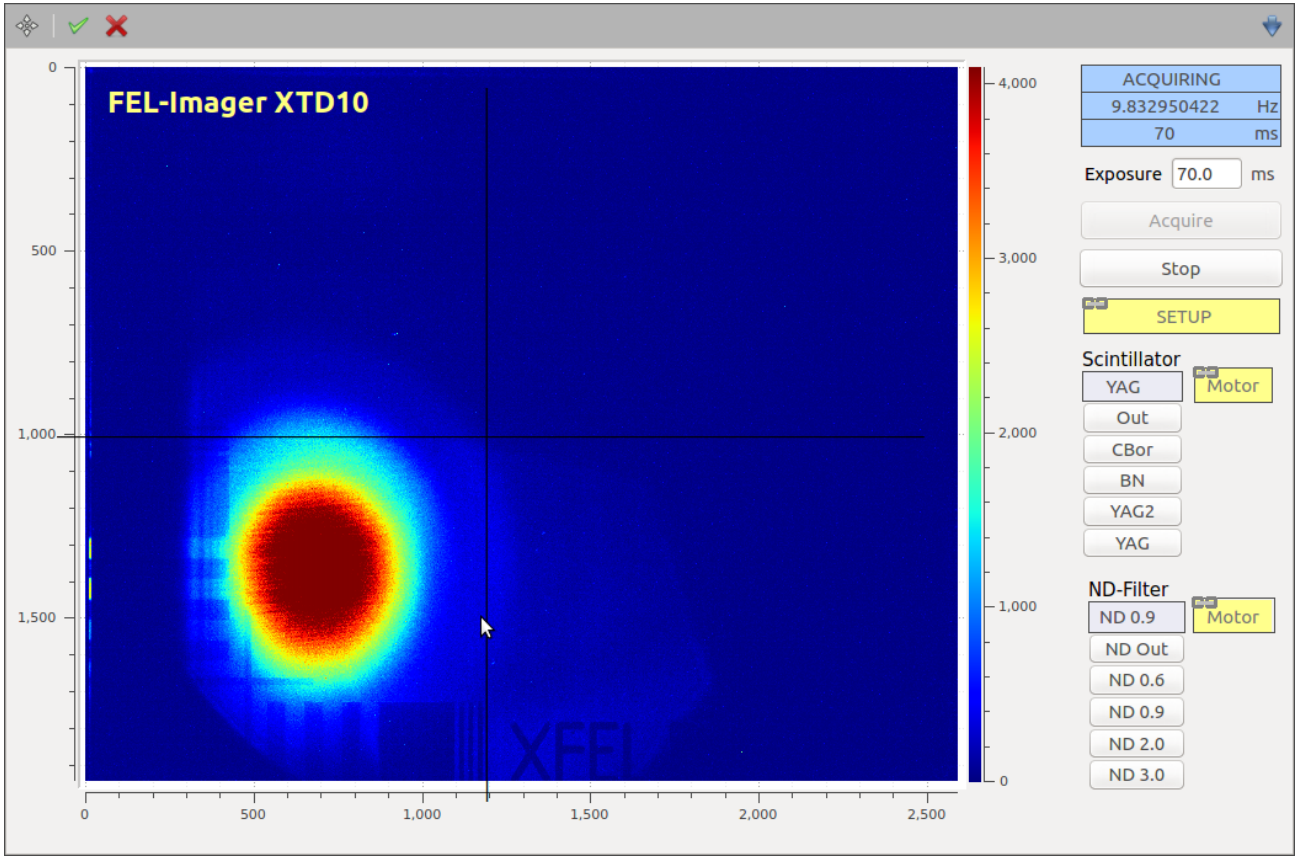
# … and more downstream



# Karabo GUI of beamline (only tunnel)

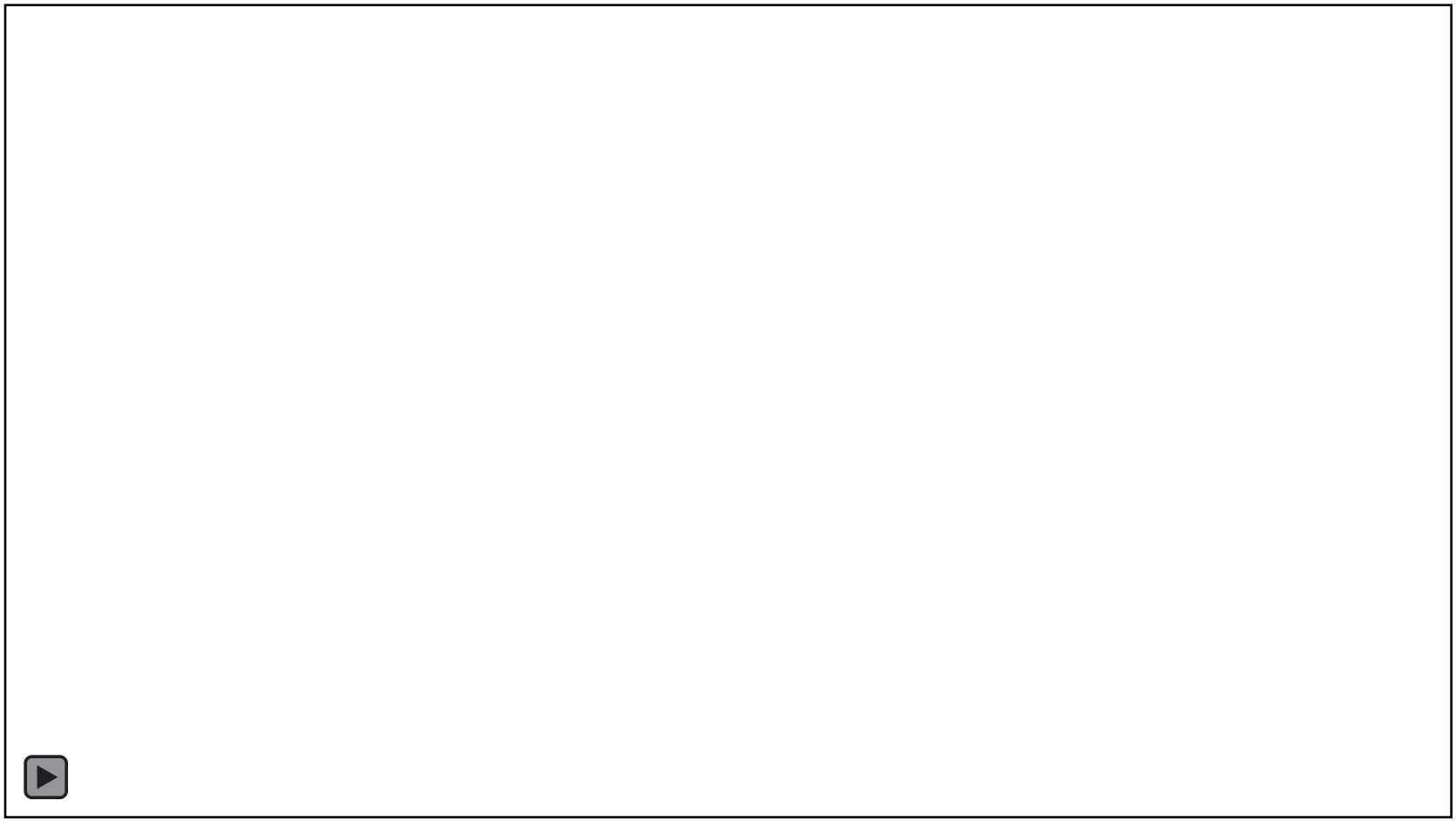


# Last Thursday: First lasing observed from SASE3



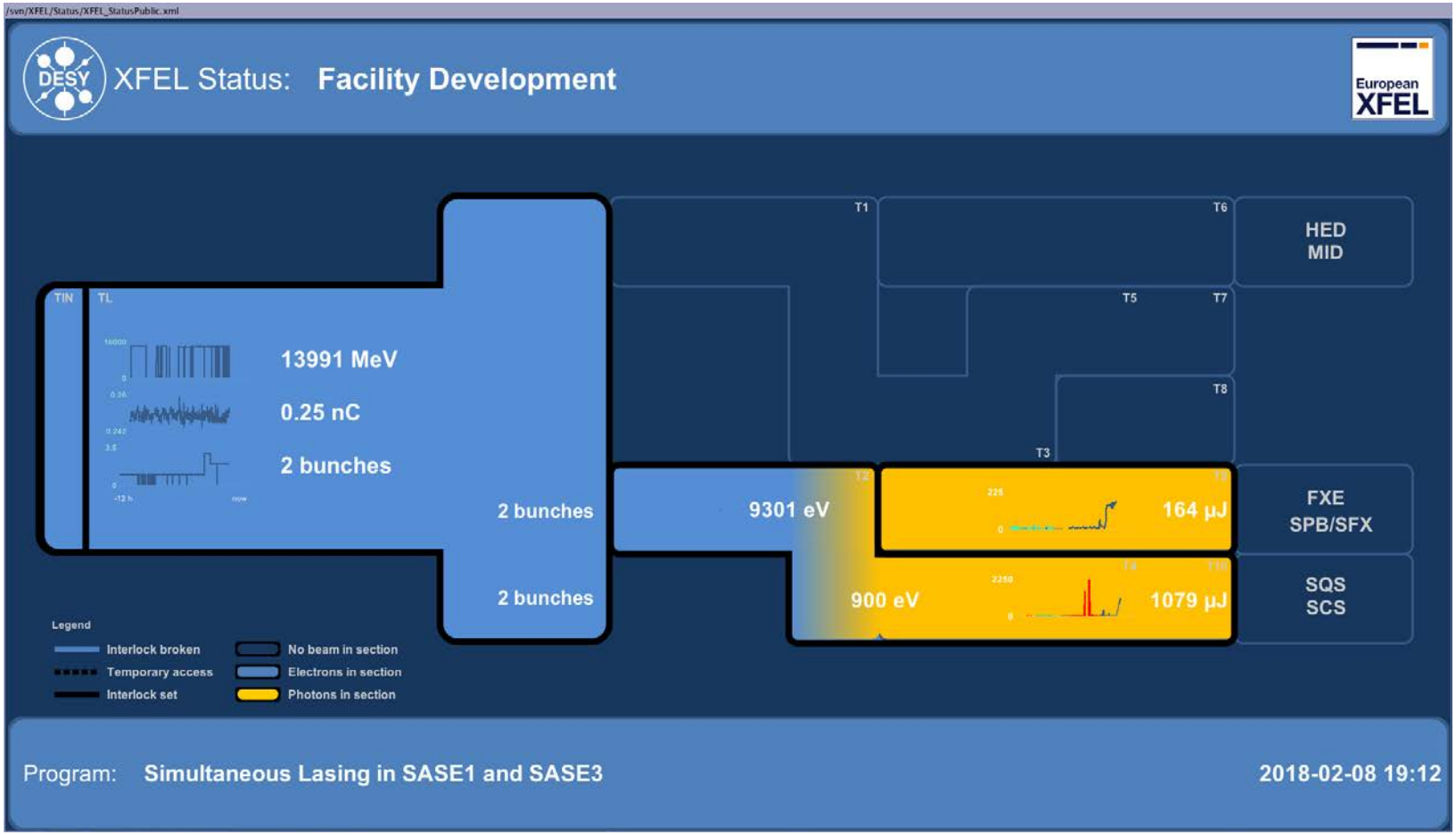
First simultaneous lasing SASE3&1 on 8.12.18.
Photo by Edgar Weckert on Dirk Noelles camera

# Video

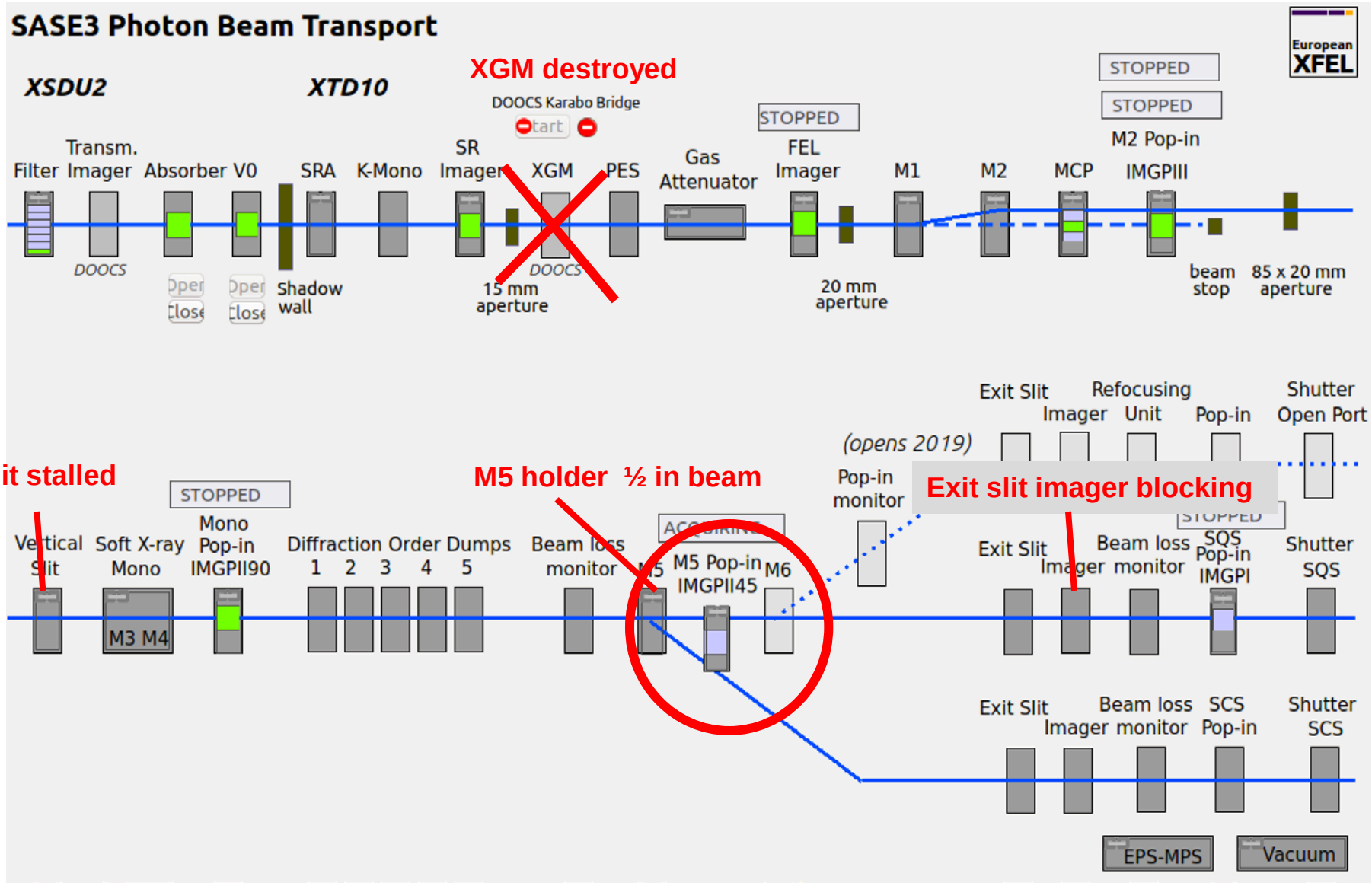


# About the difficulty of first SASE3 tuning …

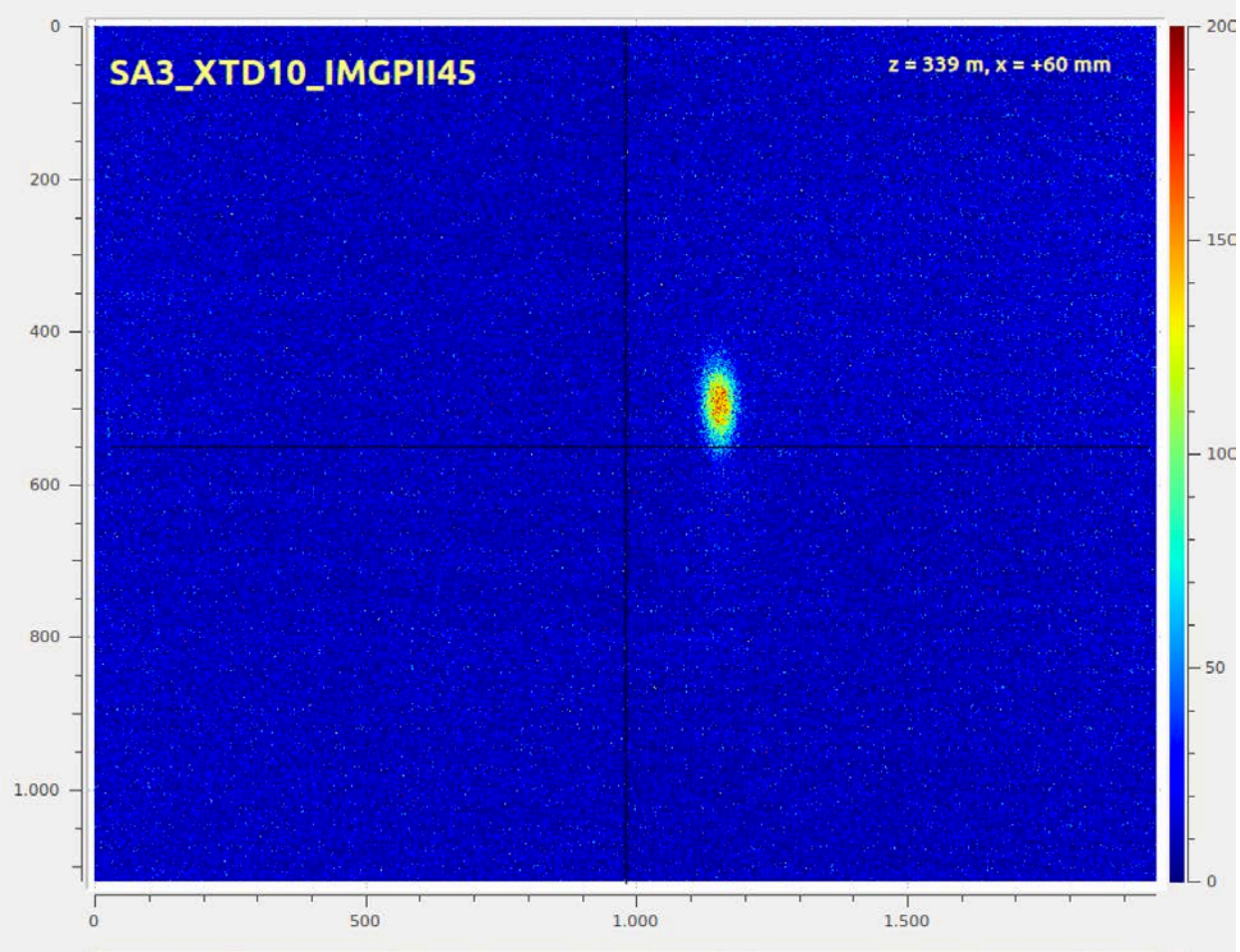
# …only one hour later …



# Actual state today (after long weekend)



# Beam 77 m in front of SQS shutter:



## Next steps (this month)

- Wednesday: Access day to repair many things from last week
- With accelerator: Get SASE1 up to speed, steering SASE3 to center beam to beamline
- With accelerator: Fresh bunch technique!
- Get gas attenuator working
- First beam on mono (exit slits open, potentially observe spectrum with exit slit imager)

# Current operations parameters for SASE3

- Electron energy 14 GeV ✔
- Photon energy 1 keV (900 eV) ✔
  (a few other fixed photon energies from 500 eV to 3000 eV possible) ???
- Tunability limited ???
- Bandwidth 0.5 % of fundamental wavelength (SASE mode) ✔
- Monochromator can be used (see next week) ✔
- X-ray pulse duration 50 – 100 fs FWHM (25 fs) ✔
- X-ray pulse energy 0.5 - 3 mJ (2 mJ) ✔
- Number of pulses about 300 pulses per train (i.e. 3000 per second)
  to be settled with radiation safety group ✔
- Repetition rate in train 1 MHz ✔
- Polarization linear (horizontal) ✔
- Focus size 1.5 – 2.5 micron (10 micron)
  to be seen in summer ✔

# Thank you for your attention!