AMO science opportunities at the CAMP instrument at beamline FL12 FLASH1

Capabilities for the Early Science AMO Community proposals for seeded FLASH1

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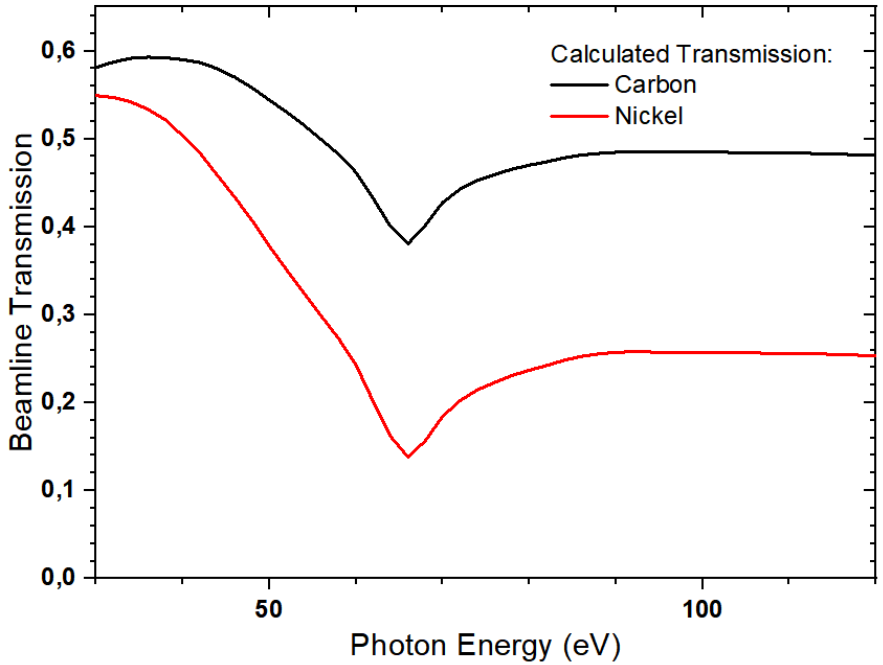
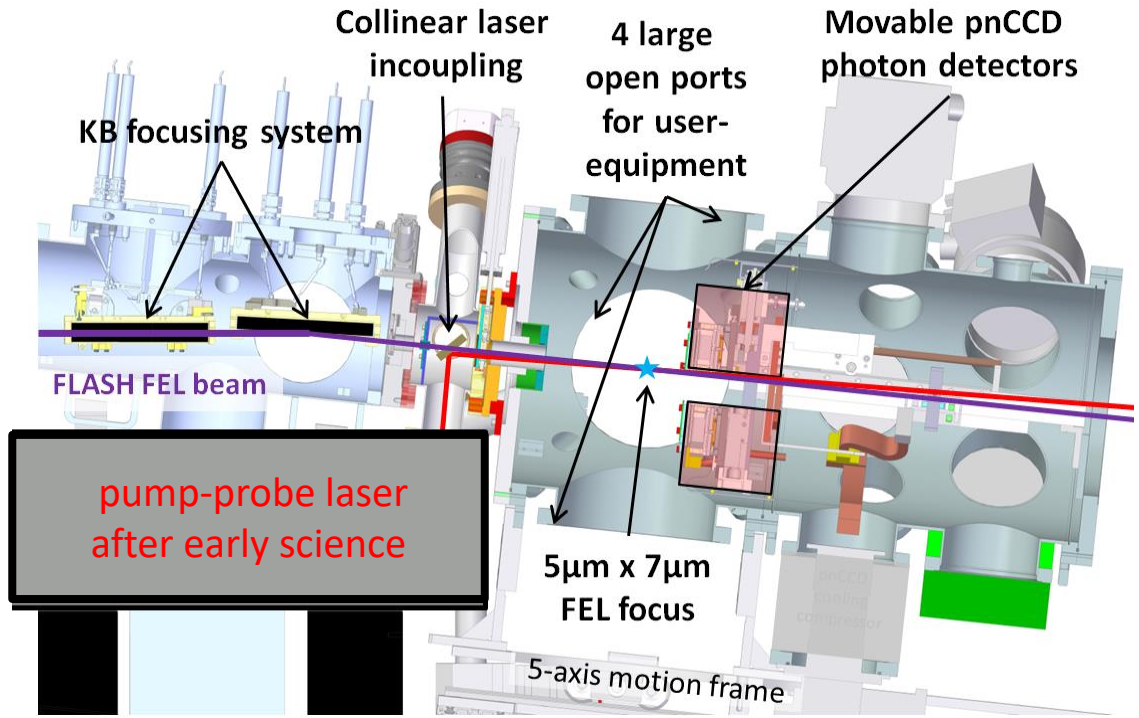
HELMHOLTZ

DESY.

Beamline ~~BL1~~ FL12 and the CAMP instrument

Beamline **FL12** transmission after 2025:





CAMP ref: B. Erk et al., Journal of synchrotron radiation 25(5), 1529 - 1540 (2018)

Transmission with additional transport mirror:

- ~48% at 85-120eV;
  ~38% dip around 66eV due to Ni coating on KBs

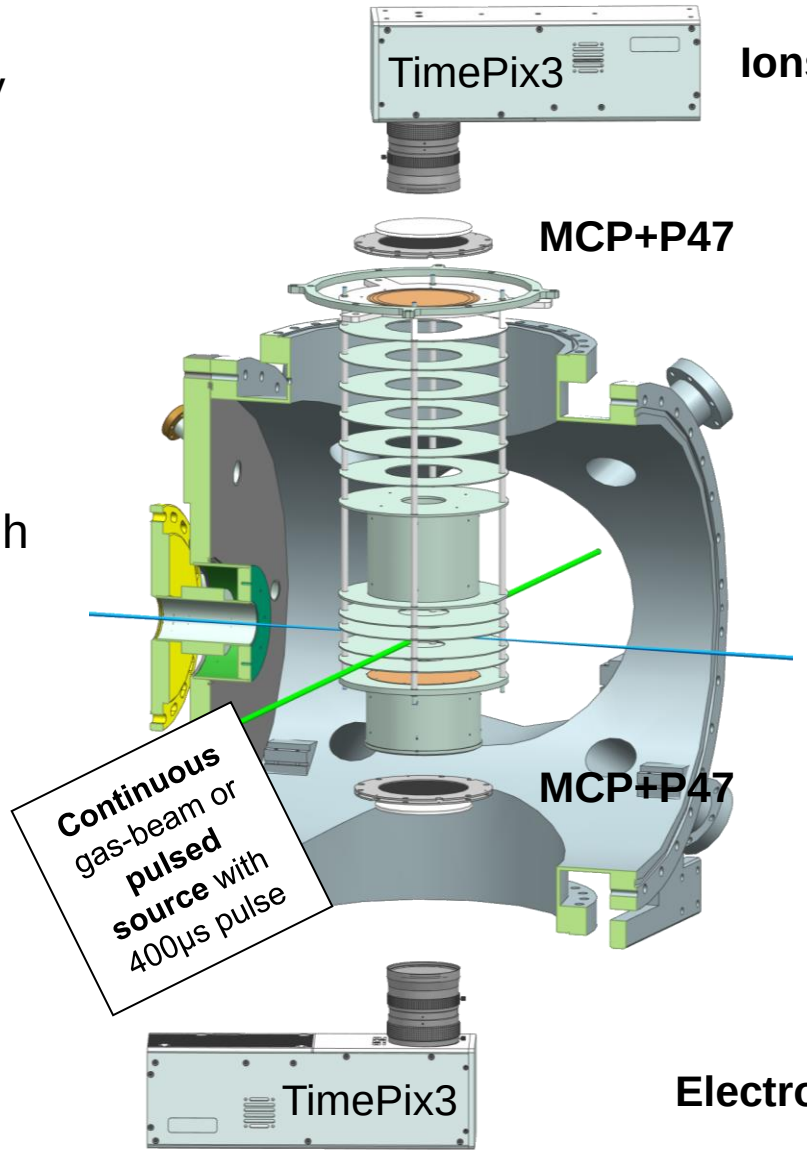
Estimated peak intensity:

- Assuming for 920MeV ~9µJ of FEL output at 60eV and ~28fs
- **~ 5x10^{14} W/cm^2** assuming Gaussian beam
  if focusing not perfect etc. easily 4-5x lower

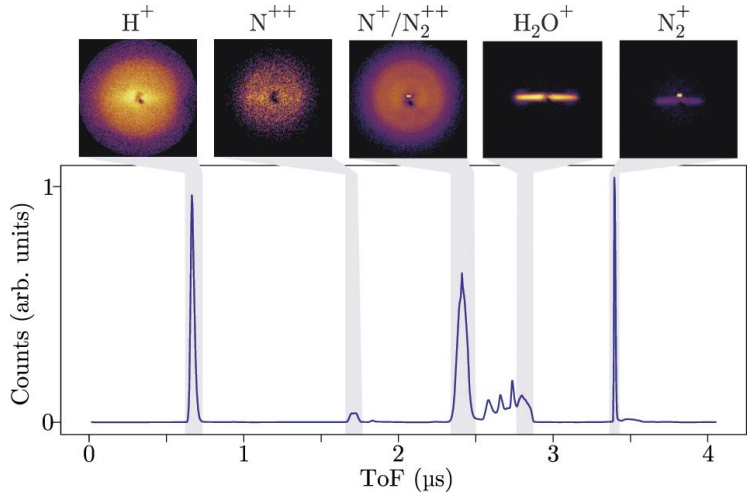
Charged particle momentum spectroscopy using CAMP's VMI

VMI (Velocity Map Imaging)

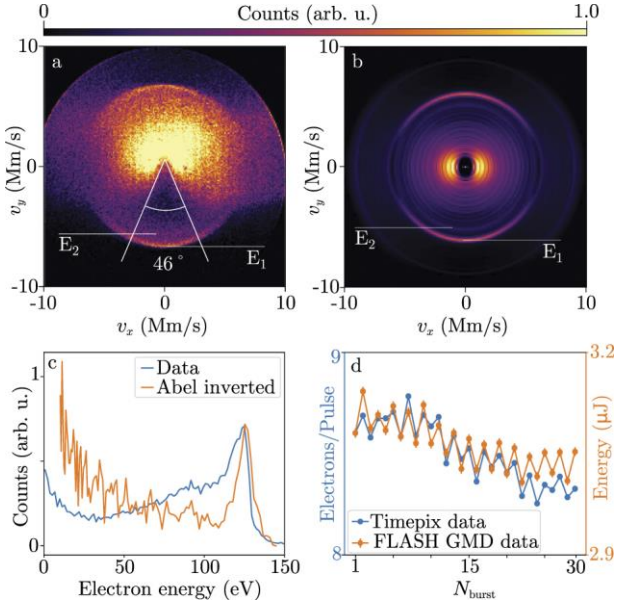
- 4π acceptance for high kin. energy fragments (dE/E ~2%)
- ToF and/or angular distribution in the detector plane
- With **two TimePix** cameras compatible to **kHz burst-mode single shot measurements** at high hit-rates (>100 ions/e$^-$ per pulse) but also low rates -> coincidences
  - time resolution ~2ns -> limitation for electron 3D measurements
  - TimePix4 will have down to 200ps time resolution
- Vacuum typically in low 10^{-9} mbar regime, but could be improved



Ions



Electrons



H. Bromberger et al., Journal of Physics / B 55(14), 144001 (2022)