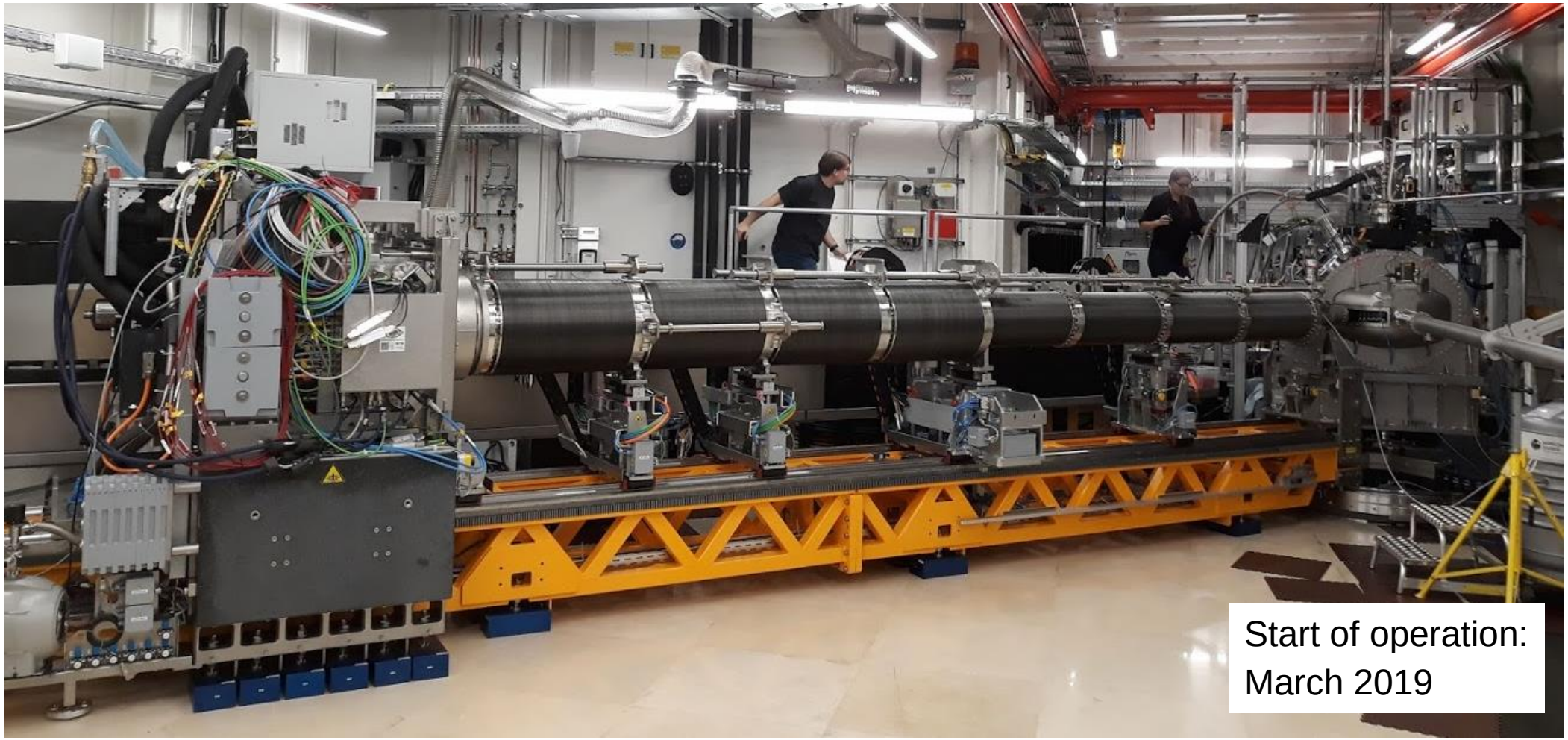
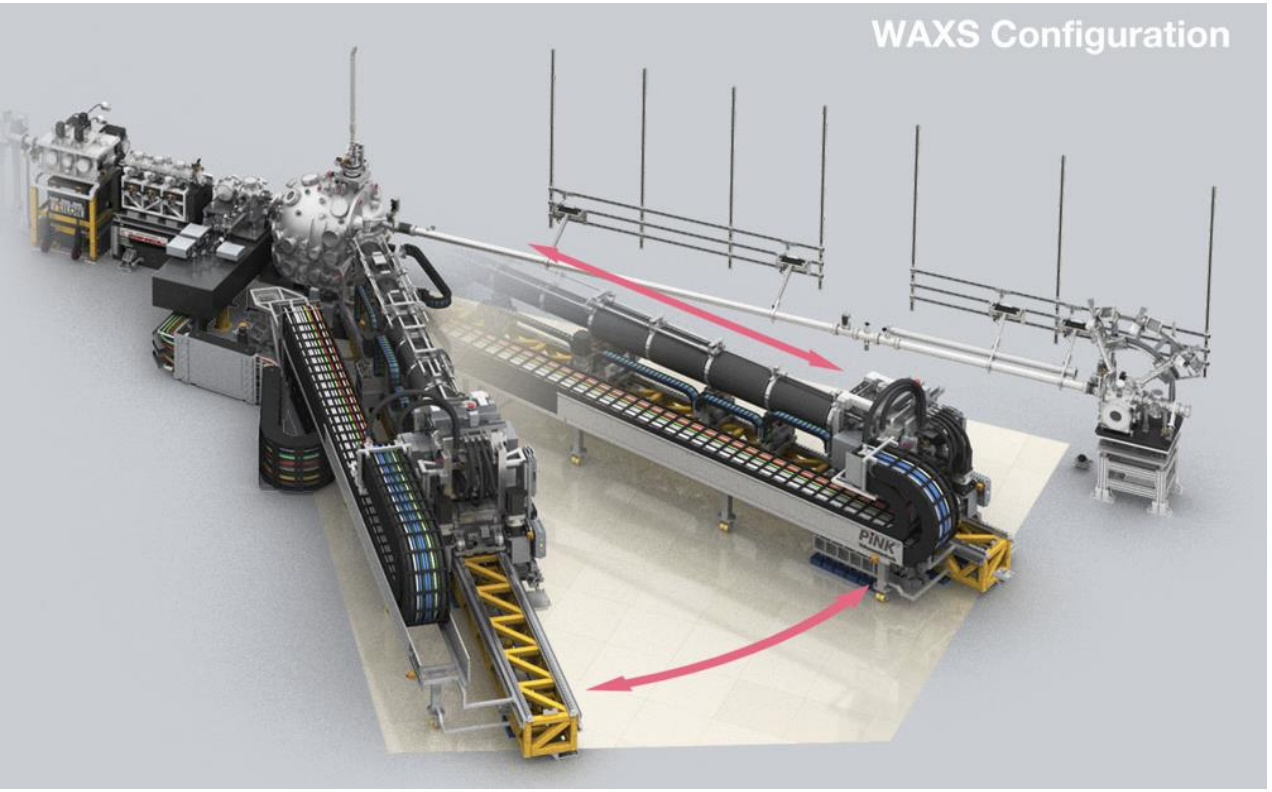
Call 9 Townhall Meeting, May 2022

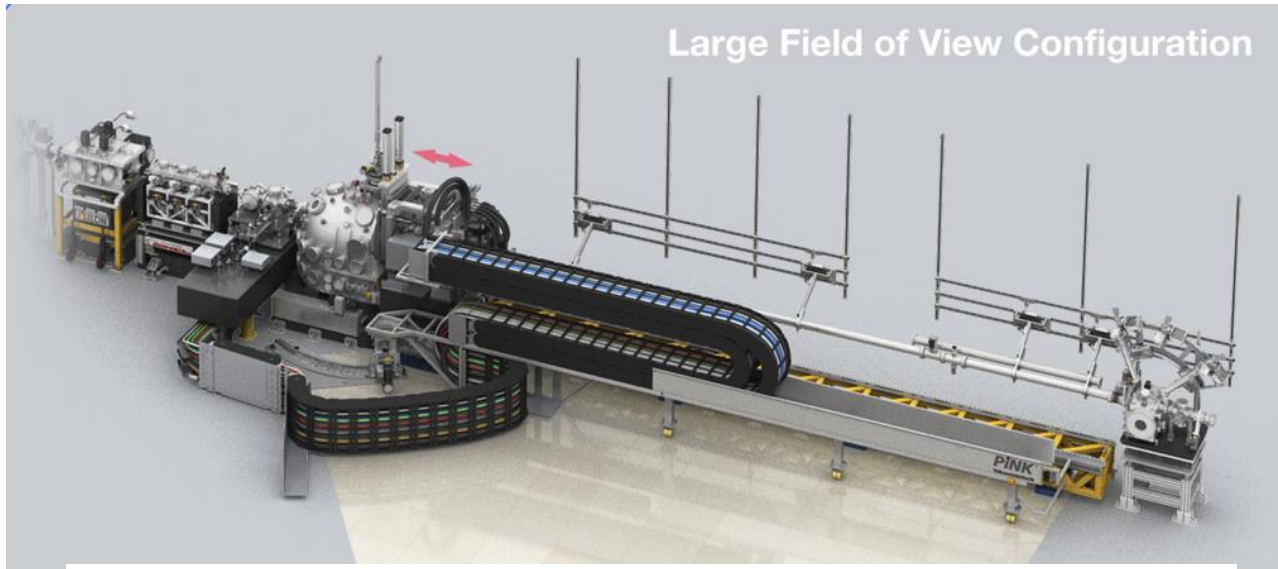
MID: Materials Imaging and Dynamics Instrument



MID: versatile hard X-ray instrument for scattering and imaging exp



AGIPD: MHz area detector, 10^6 pix, 200 μm pix size
ePix, Gotthard detector, CCD cameras,…
Versatile setup, multi-purpose interaction chamber
Windowless (in-vacuum setup) or sample in air
Sample - detector dist: 0.2 m (LFOV) to 8 m (HiRes)
2θ up to ~50º , 5 - 24 keV (7-18 keV used so far)

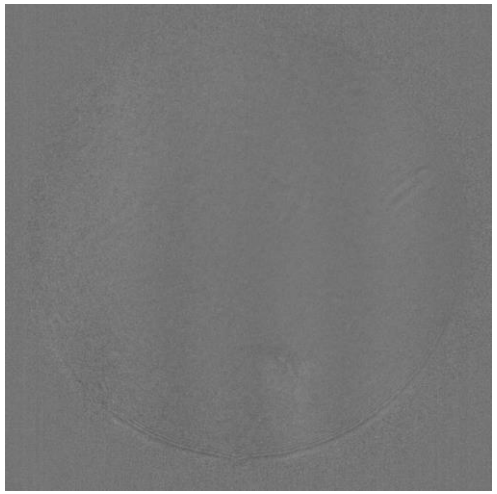


X-ray scattering and imaging: SAXS, WAXS, XPCS,
phase contrast imaging and holography, CXDI,
nano focusing, fs laser pump - X-ray probe, pulsed B field

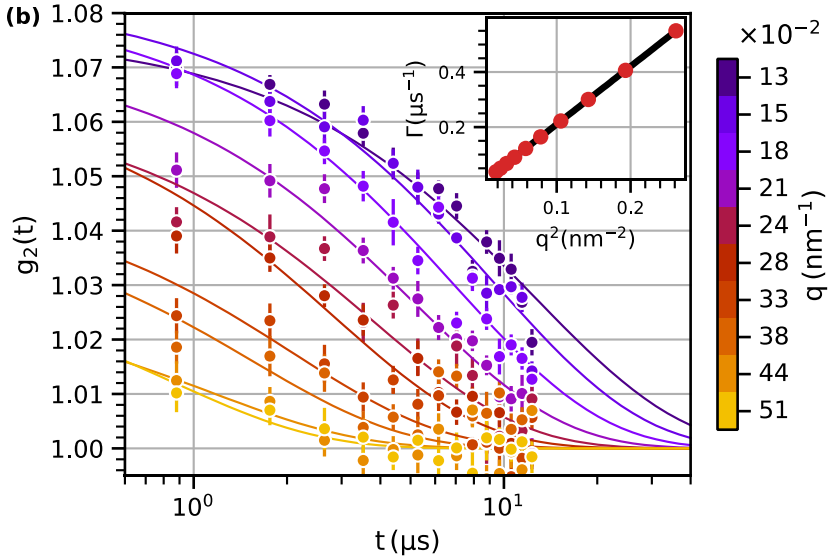
A. Madsen *et al.,* JSR (2021) **28**, 637
https://scripts.iucr.org/cgi-bin/paper?S1600577521001302

MID science

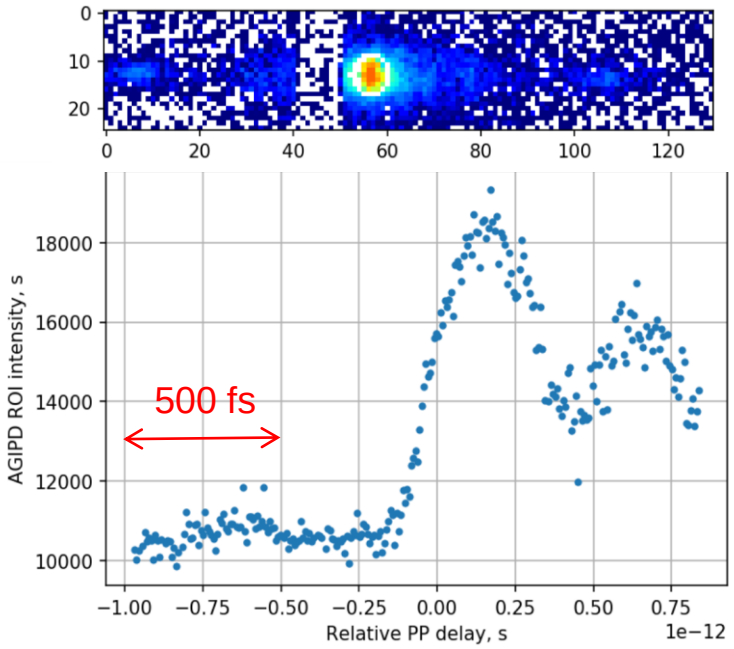
TR Imaging (holography)



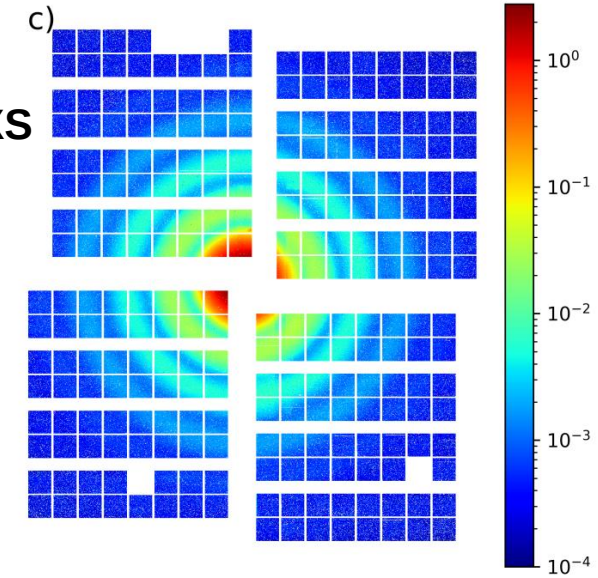
MHz XPCS



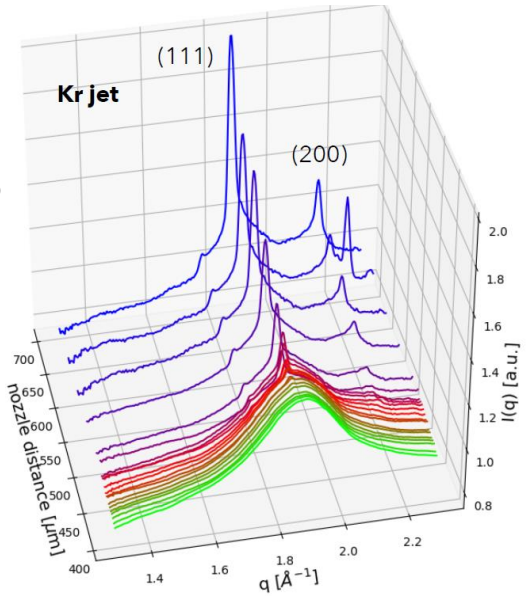
Laser pump – X-ray probe



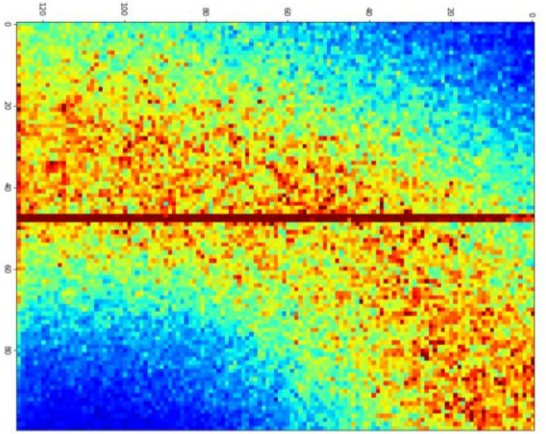
TR-SAXS



TR-WAXS



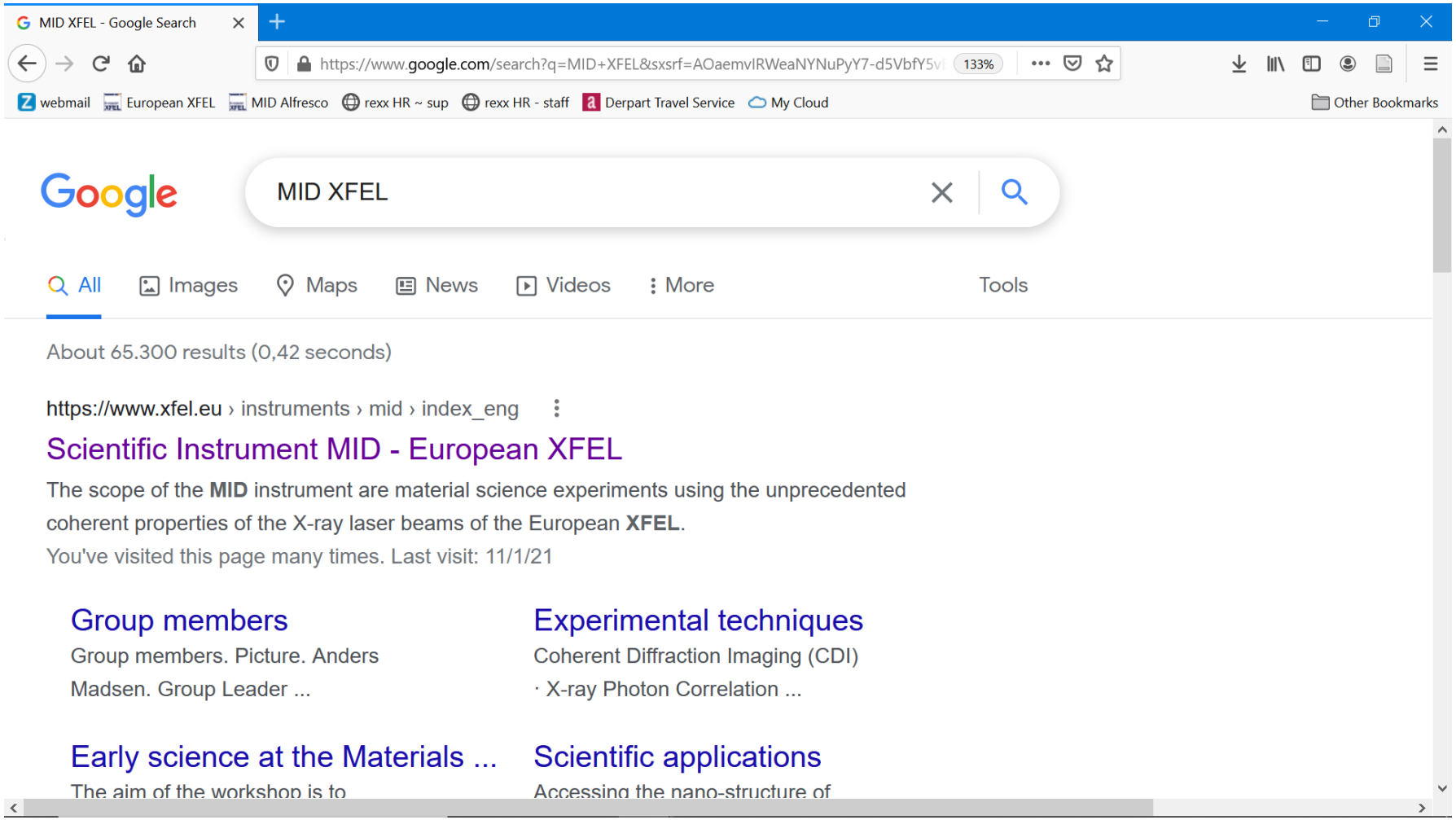
Coherent scattering and speckle



MID in Call 9

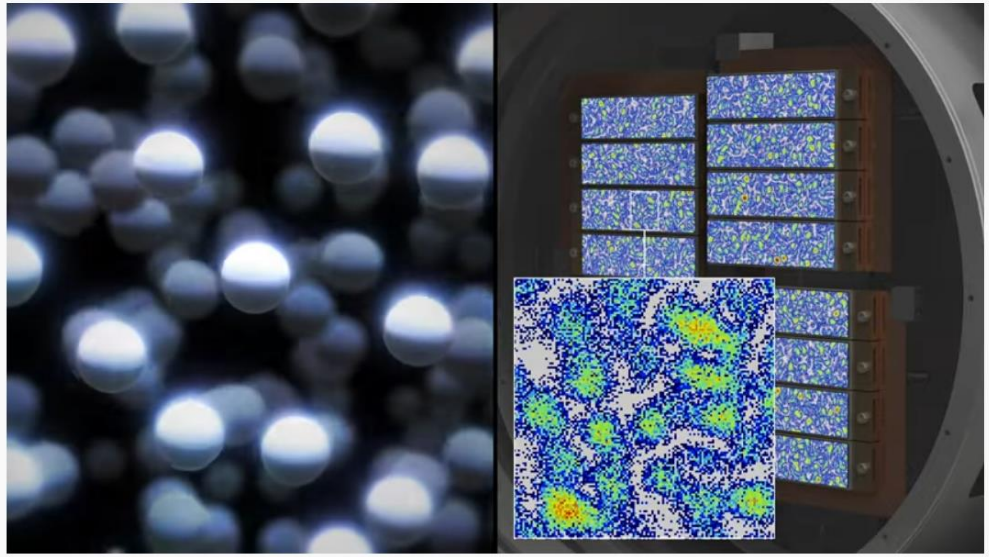
- **Specifications similar to Call 8**
- **Standard configuration available for small-angle MHz XPCS**
  - AGIPD MHz area detector, 1M pixels, 200 um pixel size
  - 7–12 keV, ~2 mJ/pulse
  - Min. correlation function lag time 440 ns, max. lag time 88 µs
  - q-range (8 m sample–detector distance): ~7×10^{-3} – 0.1 $Å^{-1}$ (small angle scattering)
  - Beam size on sample: ~1–10 µm with EH optics, >10 µm with tunnel optics
- **Hard X-ray split-and-delay line open for proposals**
  - Photon energy: ~7 – 10 keV
  - Delay range: -10 – 800 ps
  - Bandwidth: ~ 6×10^{-5} , 2 × 4 Si(220) reflections
- **Self-seeding available (discuss with MID group before submission of proposal)**
  - Up to ~0.8 mJ achieved in ~1 eV bandwidth at 9 keV
  - Tested up to ~13 keV, probably possible to go even higher…

Need more information?



Get in touch!! mid-info@xfel.eu

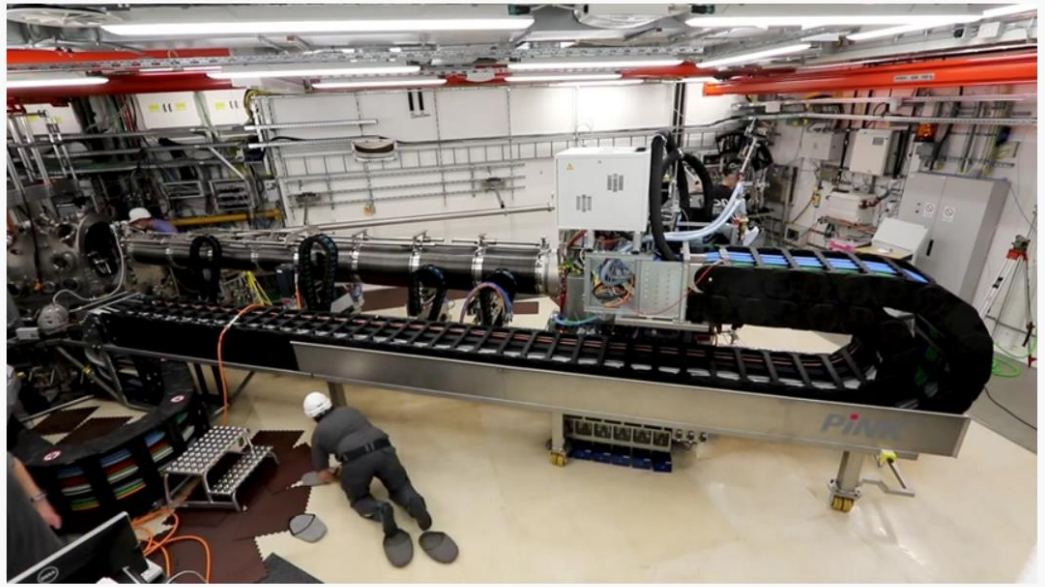
MID on YouTube



The MID instrument at the European XFEL

https://www.youtube.com/watch?v=S-ACzHyFIIk

https://www.youtube.com/watch?v=vCrrtuHSWsc



MID change of configuration time-lapse