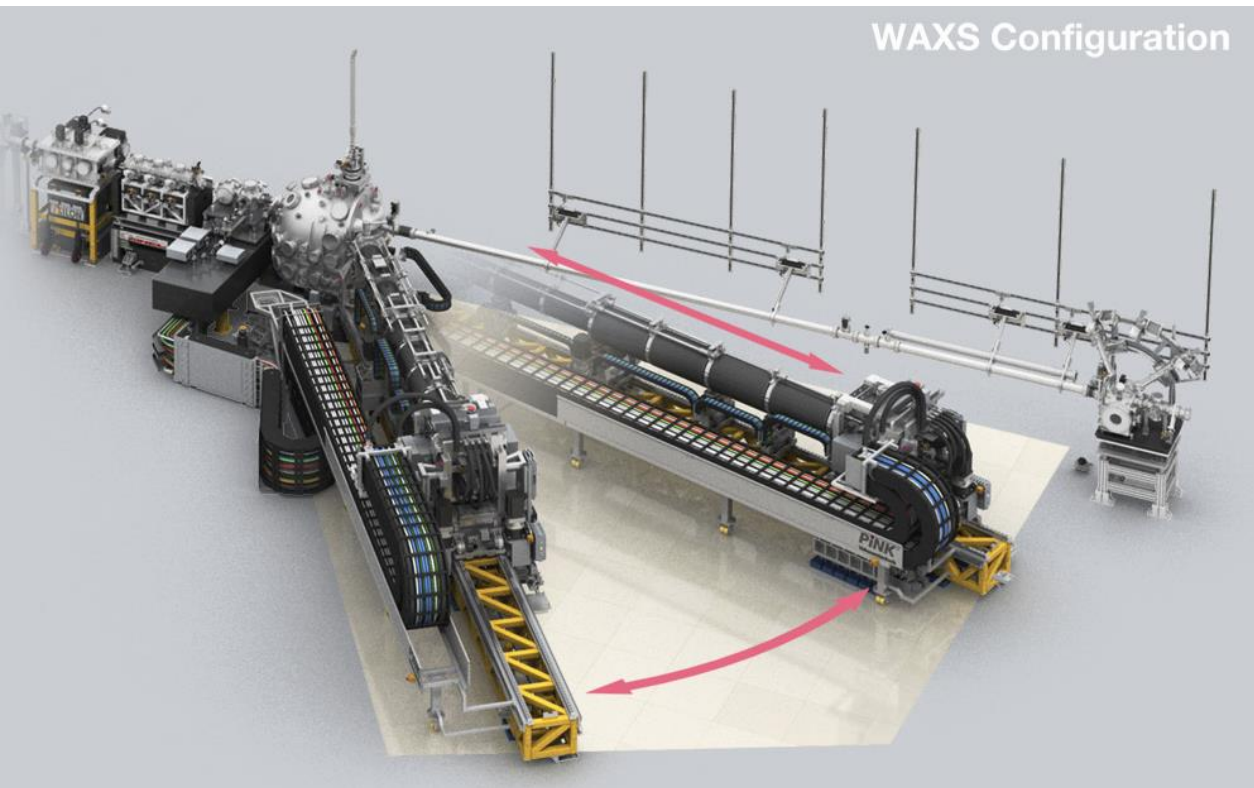


# Materials Imaging and Dynamics (MID) instrument

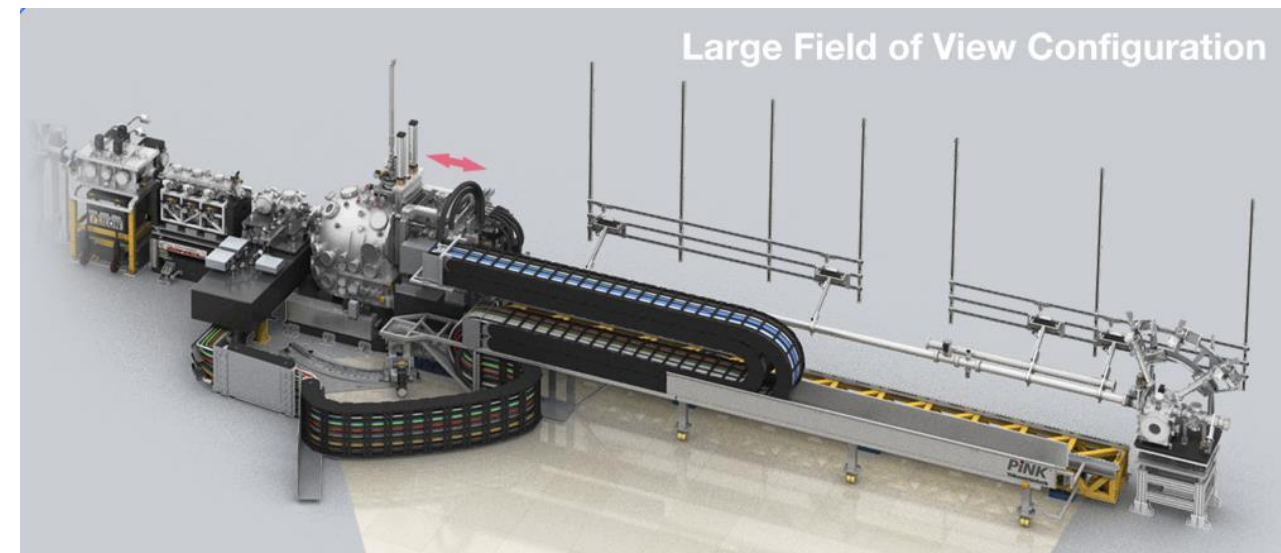


## Versatile scattering/imaging setup

Flexible geometry: SAXS, WAXS, Large Field of View  
Sample - detector distance  $\sim 0.2 - 8$  m,  $2\theta$  up to  $\sim 50^\circ$   
5 - 24 keV,  $\sim 10^{12}$  ph/pulse @ 9 keV

MHz and Mpixel area detector (AGIPD), Hi-res CCDs  
Windowless (all in-vacuum setup) or sample env. in air

Self-seeding or mono, 800/400 nm fs laser, nano focusing

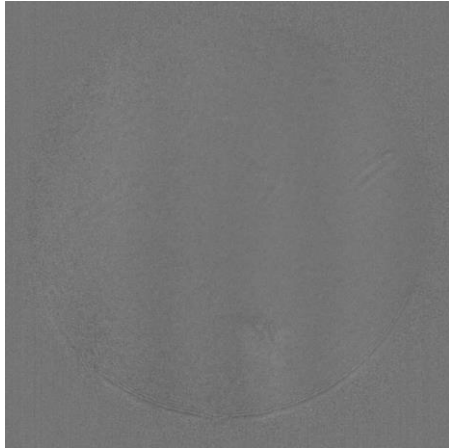


Start of operation: March 2019

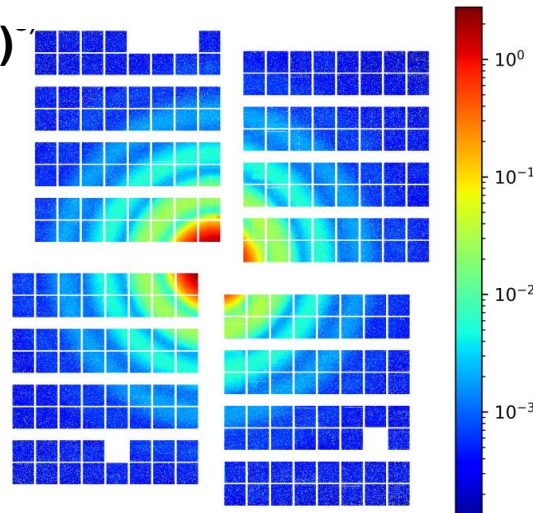
A. Madsen *et al.*, *J. Synch. Rad.* **28**, 637 (2021)

# MID science

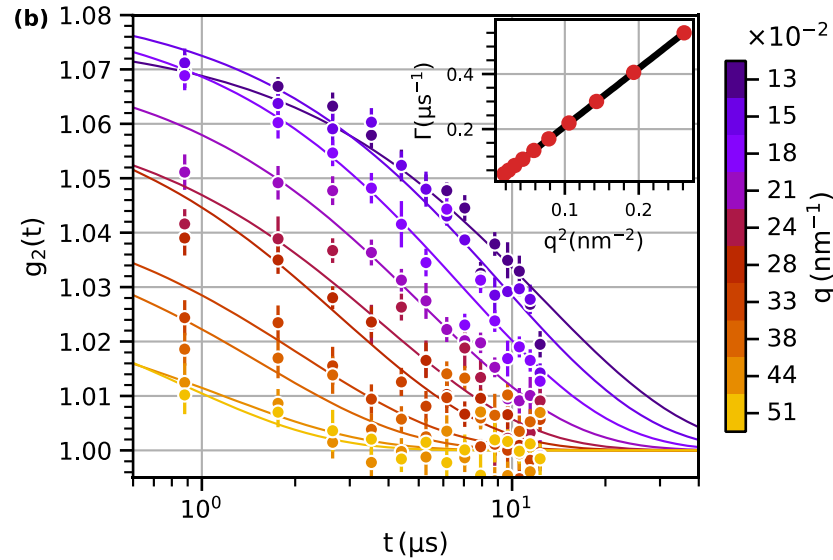
Cavitation bubble dynamics  
(TR imaging, NF holography)



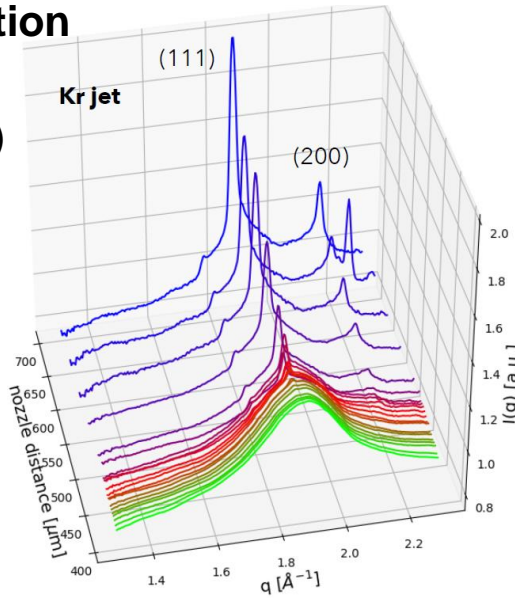
Colloidal science  
(TR-SAXS)



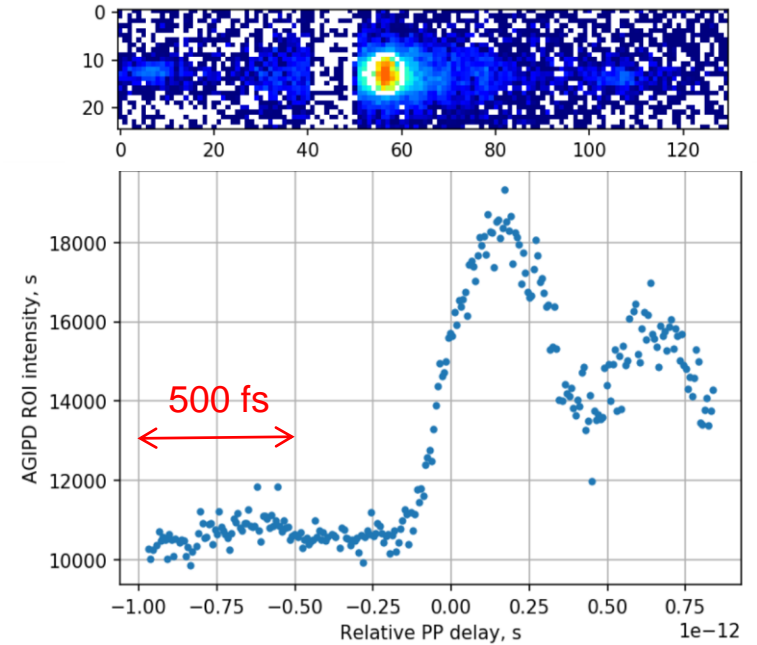
## Protein dynamics (MHz XPCS)



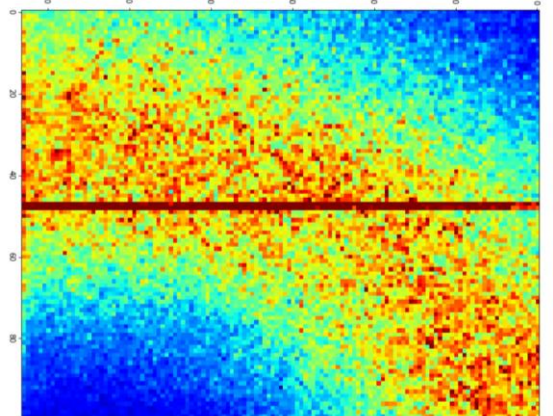
## Crystallization kinetics (TR-WAXS)



## LA phonons in STO (fs laser pump – X-ray probe)



## Coherent scattering and speckle



# MID open for Call 11

■ **Deadline for submission: May 11 at 16h (CEST). Scheduling period: Feb-Jun 2024**

■ **Specifications very similar to Call 10**

■ **Standard configuration available for small-angle MHz XPCS**

AGIPD MHz area detector, 1M pixels, 200  $\mu\text{m}$  pixel size

7–12 keV,  $\sim 2$  mJ/pulse (SASE)

Min. correlation function lag time 440 ns, max. lag time 88  $\mu\text{s}$

q-range (8 m sample–detector distance):  $\sim 7 \times 10^{-3} - 0.1 \text{ \AA}^{-1}$  (small angle scattering)

Beam size on sample:  $\sim 0.5 - 10 \mu\text{m}$  with large NA optics,  $> 10 \mu\text{m}$  with tunnel optics

■ **Hard X-ray split-and-delay line open for proposals (two color, XPXP, XSVS,...)**

Photon energy:  $\sim 7 - 10$  keV

Delay range:  $-10 - 800$  ps

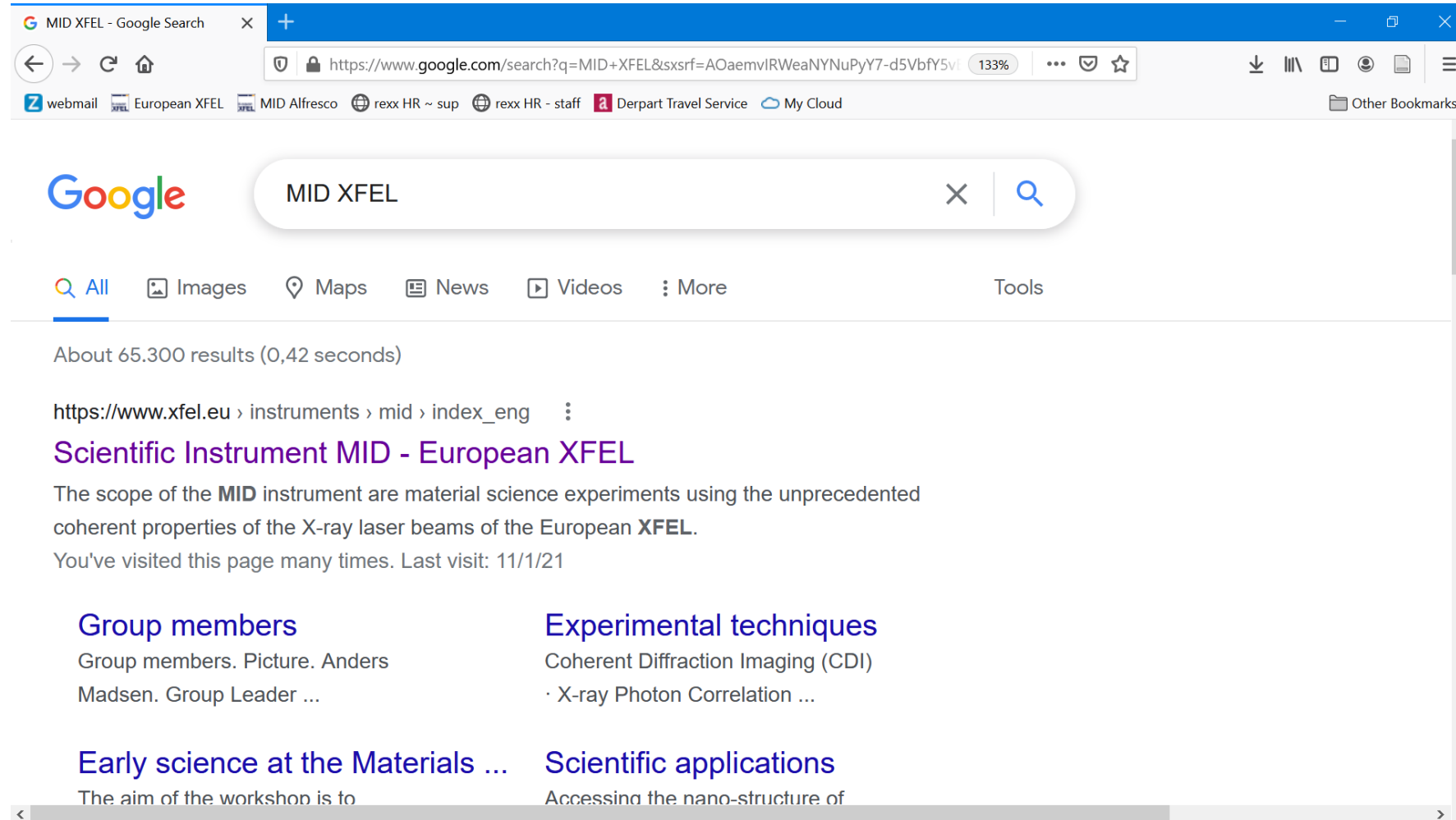
Bandwidth:  $\sim 6 \times 10^{-5}$ ,  $2 \times 4$  Si(220) reflections

■ **Self-seeding available (discuss with us well ahead of submitting the proposal)**

Up to  $\sim 0.8$  mJ achieved in  $\sim 1$  eV bandwidth at 9 keV

Tested up to  $\sim 18$  keV, special preparations required...

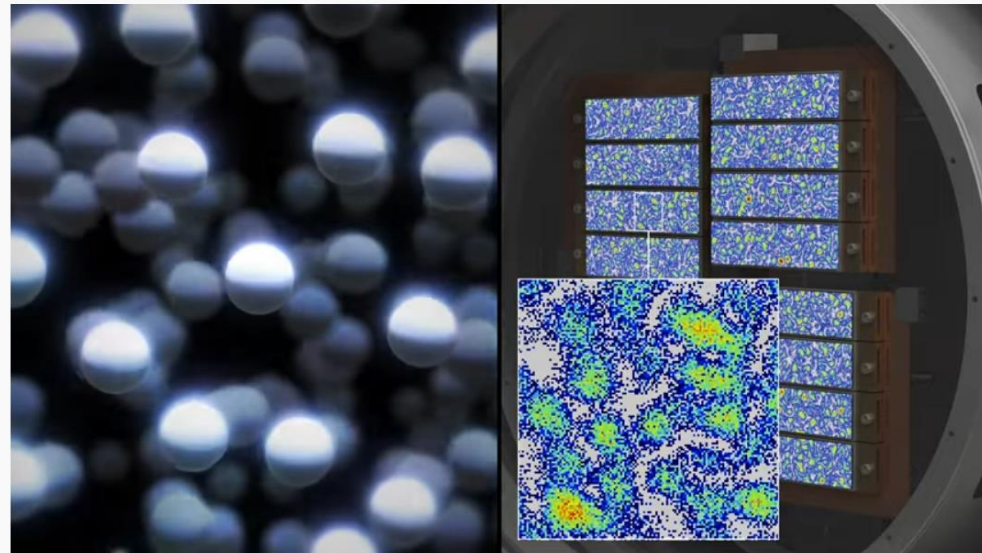
# Need more information?



Get in touch!! [mid-info@xfel.eu](mailto:mid-info@xfel.eu)



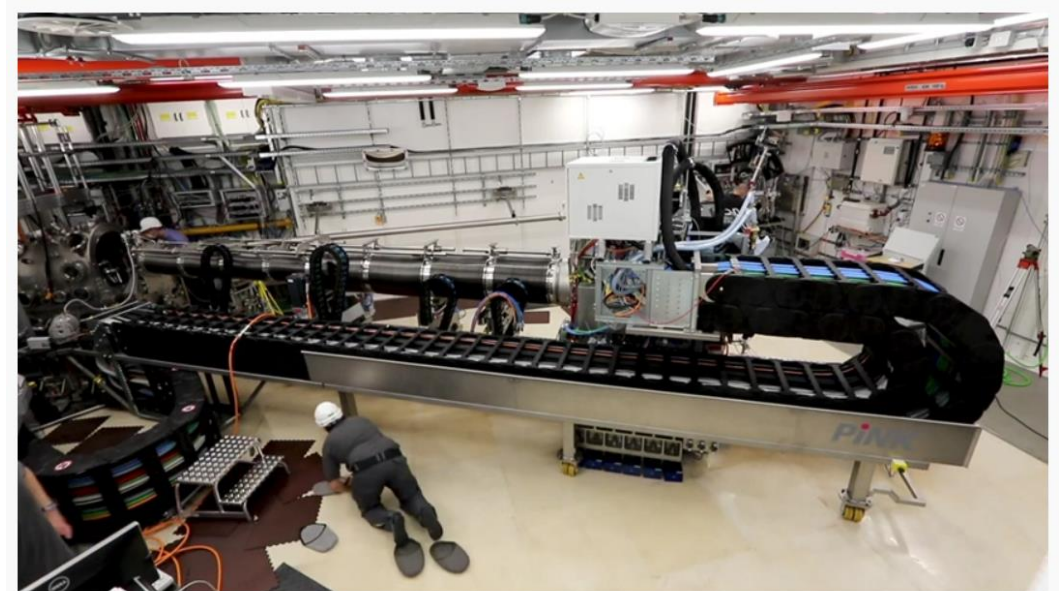
# MID on YouTube



The MID instrument at the European XFEL

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

<https://www.youtube.com/watch?v=vCrriuHSWsc>



MID change of configuration time-lapse