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## CoSAXS beamline at MAX IV: optical design and sample environment for advanced SAXS/WAXS applications

*Tuesday 16 September 2025 17:00 (1 hour)*

CoSAXS is a versatile SAXS/WAXS beamline at the 3 GeV diffraction-limited ring of MAX IV Laboratory in Sweden. The optical design [\* ,\*\*] delivers X-ray beams from 4–20 keV with 0.01% bandwidth and photon flux of  $10^{12}$ – $10^{13}$  ph/s, with up to 10% coherent flux at 7.1 keV. Beam sizes at the sample range from  $250 \times 250 \mu\text{m}^2$  to  $30 \times 15 \mu\text{m}^2$  (FWHM). The SAXS detector (Eiger2 4M) moves longitudinally and transversely inside a 15 m vacuum vessel. The fixed WAXS detector (Pilatus3) is positioned at the vessel entrance, and a Mythen2 1K in air provides 1D WAXS. The q-range spans  $\sim 6 \times 10^{-4}$  to  $3 \text{ \AA}^{-1}$  (d-spacings:  $1 \mu\text{m}$ – $2 \text{ \AA}$ ). Supported techniques include solution and solid SAXS/WAXS, SEC/AF4-SAXS [\*\*\*\*\*], USAXS, TRSS in the ms range [\*\*\*, \*\*\*], and coherent scattering [\*\*\*\*]. Sample environments include magnetic fields, rheology, biaxial stretching [\*\*\*\*\*], and microfluidics [\*\*\*\*\*]. Control and data systems are described in [\*\*\*]. After nearly 5 years of operation, CoSAXS has completed 190 proposals, including 19 proprietary research projects. The beamline has a high demand and has contributed to 47 publications.

### Footnotes

- \* A.J. Allen, J. Appl. Cryst. 56, 787 (2023)
- \*\* T.S. Plivelic, et al. AIP Conf. Proc. 2054, 030013 (2019)
- \*\*\* O. Berntsson, et al. J. Synchrotron Rad. 29, 555 (2022)
- \*\*\*\* V. Silva, et al. JACoW ICALEPCS2023 713 (2023)
- \*\*\*\*\* M. Kahnt, et al. J. Synchrotron Rad. 28 1948 (2022)
- \*\*\*\*\* P. Mota-Santiago, et al. J. Appl. Cryst. 56 967 (2023)
- \*\*\*\*\* H. Bolinsson, et al Anal. Bioanal. Chem. 415, 6237 (2023)
- \*\*\*\*\* J. Gilbert, et al. J. Colloid Interface Sci 660, 66 (2024)

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**Author:** DA SILVA, Matheus (MAX IV Laboratory)

**Co-authors:** TERRY, Ann (MAX IV Laboratory); AHN, Byungnam (MAX IV Laboratory); HERRANZ TRILLO, Fatima (MAX IV Laboratory); DA SILVA, Jackson Luis (MAX IV Laboratory); Mr ALCOCER, Marcelo (MAX IV Laboratory); Mr LEORATO, Marco (MAX IV Laboratory); Dr BARREA, Raul (Benedictine University); APPIO, Roberto (MAX IV Laboratory); PLIVELIC, Tomás (MAX IV Laboratory); DA SILVA, Vanessa (MAX IV Laboratory)

**Presenter:** DA SILVA, Matheus (MAX IV Laboratory)

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