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Extended Time-Resolved Experimental Capabilities and Performance at the MAX IV FemtoMAX Beamline

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The FemtoMAX beamline is a unique LINAC-driven time-resolved laser pump/x-ray probe beamline dedicated to study solids and liquids. The beamline is designed to explore dynamics in condensed matter materials at time scales ranging from femtoseconds to microseconds [1]. The sub-50 fs x-ray pulses are generated in two in-vacuum undulators, with a photon energy tuneable between 1.8 - 15 keV at a repetition rate of 10 Hz. The femtosecond laser excitation source spans wavelengths of 400 nm-1.6 µm and THz frequencies. A Pilatus time-over-threshold single photon counting detector and a collection of sCMOS detectors are employed to capture SAXS/WAXS and diffraction signals. In addition, ultrashort x-ray pulses in combination with fast detectors can be used to study x-ray time resolved fluorescence from fast scintillators, nanofilms and organic materials. Here, we present recent advances in providing methods and capabilities to the user community, this includes solution scattering and transient x-ray spectroscopy, which is under development and will be ready for general user experiments year 2024. We also present a novel approach to do timestamping and sorting pump/probe data, based on optical cross-correlation, leading to a significant increase in achievable time resolution. With these efforts, we are widening the scientific scope of the FemtoMAX beamline and open up for building a large user community.

References

1. Enquist Henrik, Jurgilaitis Andrius, Jarnac Amelie, Bengtsson Asa U. J., Burza Matthias, Curbis Francesca, Disch Christian, Ekstrom J. Carl, Harb Maher, Isaksson Lennart, Kotur Marija, Kroon David, Lindau Filip, Mansten Erik, Nygaard Jesper, Persson Anna I. H., Van Thai Pham, Rissi Michael, Thorin Sara, Tu Chien-Ming, Wallen Erik, Wang Xiaocui, Werin Sverker, Larsson Jorgen

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I plan to submit also conference proceedings

No

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