Contribution ID: **7** Type: **Talk**

Sub-fs reference timing - Model based optimization of the EuXFEL sychronisation system

Thursday 26 June 2025 14:00 (20 minutes)

Sub-femtosecond short and long-term stable timing reference signals for the LLRF systems, longitudinal beam diagnostics and experiment laser systems are the next milestone on the road towards more advanced few-femtosecond and attosecond resolved experiments at the latest generation of FELs such as FLASH (2020+) and European XFEL. Using a comprehensive model of the laser-based synchronization system at European XFEL, feedback parameters of the actual system were optimized to achieve sub-fs timing stability over 7km of transmission distance. The model also allows for jitter budget analysis and provides a comprehensive roadmap for necessary future R&D efforts.

Summary

Primary author: SCHUETTE, Maximilian (MSK (Strahlkontrollen))

Co-authors: CALENDRON, Anne-Laure (MSK (Strahlkontrollen)); EICHLER, Annika (MSK (Strahlkontrollen)); GRUENHAGEN, Arne (MSK (Strahlkontrollen)); SCHWICKERT, David (MSK (Strahlkontrollen)); ZUMMACK, Falco (MSK (Strahlkontrollen)); Dr SCHLARB, Holger (DESY); FELBER, Matthias (MSK (Strahlkontrollen)); KSCHUEV, Nick (MSK (Strahlkontrollen)); SCHULZ, Sebastian (Deutsches Elektronen-Synchrotron); LAMB, Thorsten (MSK (Strahlkontrollen)); KOZAK, Tomasz (DESY - Deutsches Elektronen-Synchrotron)

Presenter: SCHUETTE, Maximilian (MSK (Strahlkontrollen))

Session Classification: Beam Control

Track Classification: Beam control