

Speed Poster: Femtosecond Timing Distribution at the European XFEL

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Accurate timing synchronization on the femtosecond timescale is an essential installation for time-resolved experiments at free-electron lasers (FELs) such as FLASH and the upcoming European XFEL. To date the required precision levels can only be achieved by a laser-based synchronization system.

Such a system has been successfully deployed at FLASH and is based on the distribution of femtosecond laser pulses over actively stabilized optical fibers. For time-resolved experiments and for special diagnostics it is crucial to synchronize various laser systems to the electron beam with a long-term stability of better than 10fs. The upcoming European XFEL has raised the demands due to its large number of stabilized optical fibers and a length of 3400m. Specifically the increased lengths for the stabilized fibers had necessitated major advancement in precision to achieve the requirement of less than 10fs precision. This extensive rework of the active fiber stabilization has led to a system exceeding the current existing requirements and is even prepared for increasing demands in the future.

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