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High-reliability bunch arrival time monitor with fs precision

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The DESY's Bunch Arrival Time Monitors (BAM) are state-of-the-art sensors based on an electro-optical detection principle, that delivers information on the bunch timing with femtosecond-level precision. Recent developments concerning the device construction and automation resulted in the BAM system stability, that enables year-long participation on standard accelerator operation. Such level of stability is unprecedented, and gives access to observation of longer-term phenomena that influence the machine synchronization. Additional advances in the performance of the BAMs attacking sub-fs resolution enabled synchronization of the electron beam with a world-leading precision of less than 3fs at European XFEL.

Summary

Primary author: KRAL, Jiri (MSK (Strahlkontrollen))

Co-authors: ROEVER, Jan (MSK (Strahlkontrollen)); GEORG, Jens (MSK (Strahlkontrollen)); BUECHLER, Michael (MSK (Strahlkontrollen))

Presenter: KRAL, Jiri (MSK (Strahlkontrollen))

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