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Photon arrival time monitoring with few fs measurement uncertainty at MHz rate

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Pump and probe technique with X-ray free electron lasers (XFEL) is a powerful tool to study ultrafast X-ray matter interactions and subsequent ultrafast dynamics. It requires precise characterization of X-ray temporal properties, i.e. relative X-ray arrival time with respect to external optical laser pulses, X-ray pulse duration, and structure, preferably on a shot-to-shot basis.

In this contribution, we will give an overview of the X-ray temporal diagnostics techniques and present our X-ray/optical cross-correlation-based timing tools that can work at up to 1.13 MHz repetition rates with an ultrahigh measurement accuracy of down a few fs at the European XFEL.

Journal of Synchrotron Radiation Special Issue: will you submit your contribution?

yes

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