

Abstract Submitted
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X-ray–optical cross correlator for gas-phase experiments at the LCLS free-electron laser SEBASTIAN SCHORB, LCLS, SLAC National Accelerator Laboratory, T. GORKHOVER, Technische Universität Berlin, J.P. CRYAN, J.M. GLOWNIA, M.R. BIONTA, R.N. COFFEE, LCLS, SLAC National Accelerator Laboratory, B. ERK, R. BOLL, C. SCHMIDT, D. ROLLES, A. RUDENKO, Max-Planck Advanced-Study-Group at CFEL, A. ROUZEE, Max-Born-Institute Berlin, M. SWIGGERS, S. CARRON, J.-C. CASTAGNA, J.D. BOZEK, M. MESSERSCHMIDT, W.F. SCHLOTTER, C. BOSTEDT, LCLS, SLAC National Accelerator Laboratory — X-ray–optical pump–probe experiments at the Linac Coherent Light Source (LCLS) have so far been limited to a time resolution of 280 fs fwhm due to timing jitter between the accelerator-based free-electron laser (FEL) and optical lasers. We have implemented a single-shot cross-correlator for femtosecond x-ray and infrared pulses. An independent reference experiment relying only on the pulse arrival time information from the cross-correlator shows a time resolution better than 50 fs fwhm (22 fs rms) and also yields a direct measurement of the maximal x-ray pulse length. The improved time resolution enables ultrafast pump–probe experiments with x-ray pulses from LCLS and other FEL sources. Reference: S. Schorb et al., Appl. Phys. Lett. 2012 in press

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