

Abstract Submitted
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Measurement of the world's shortest X-ray pulses¹ WOLFRAM HELML, ANDREAS R. MAIER, WOLFGANG SCHWEINBERGER, JUSTIN GAGNON, MPQ, Garching, Germany, ADRIAN L. CAVALIERI, IVANKA GRGURAS, MPSD, Hamburg, Germany, PAUL RADCLIFFE, THOMAS TSCHENTSCHER, MICHAEL MEYER, European XFEL, Hamburg, Germany, GILLES DOUMY, ANL, Argonne, IL, CHRIS ROEDIG, OSU, Columbus, OH, JOHN D. BOZEK, RYAN COFFEE, SLAC, CA, JOHN COSTELLO, DCU, Dublin, Ireland, STEFAN DUESTERER, HASYLAB, Hamburg, Germany, REINHARD KIENBERGER, TUM, Garching, Germany — One of the essential characteristics of LCLS and other FELs that are currently in operation or still under development is their ultrashort pulse duration, further enhanced just recently by novel schemes of electron bunch compression, which opens up unprecedented opportunities for the detailed investigation of reaction dynamics. However, to date there is no measuring device or concept which is able to determine precisely the pulse duration of the generated X-ray pulses. By overlapping the FEL with a synchronized optical laser in a gas target and measuring the energy of the IR laser dressed photoelectrons ('streaking spectroscopy') we were able to determine the pulse duration of the shortest FEL pulses available at LCLS to be not more than 4 fs. In addition, an analysis of the pulse substructure yields an estimation for the length of the underlying single-spikes in the order of 600 as.

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