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Combining phase-tagging and CEP-stabilization for increased precision in CEP-dependent measurements* K. CARNES, K.J. BETSCH, A.M. SUMMERS, I. BEN-ITZHAK, J. R. Macdonald Laboratory, Physics Department, Kansas State University, Manhattan, KS 66506, USA, B. LANGDON, D. RAYMONDSON, M. KIRCHNER, KMLabs, Inc., Boulder, Colorado 80301, USA
— We have used a stereographic above-threshold-ionization phase meter to provide shot-to-shot carrier-envelope-phase (CEP) tagging on few cycle pulses from our PULSAR ultrafast laser system. PULSAR is based on a commercial Red Dragon^{TM} Ti:Sapphire system from KM Labs providing 2mJ pulses of nominal 21 fs width, reduced to sub-5 fs with a hollow core fiber and a chirped mirror compressor. By phase-tagging on a shot-to-shot basis, we can make precise measurements on the quality of PULSAR's CEP-locking system, studying long-term lock stability and the effects of shot averaging and variation of locking circuit parameters on the reported lock value. We also demonstrate the utility of a live oscilloscope output from the phasemeter in tuning the laser CEP parameters. * This work was supported by the Chemical Sciences, Geosciences, and Biosciences Division, Office of Basic Energy Sciences, Office of Science, U.S. Department of Energy under Grant No. DE-FG02-86ER13491. The PULSAR laser was provided by Grant No. DE-FG02-09ER16115 from the same agency.

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