

Abstract Submitted  
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**Generation and Characterization of Near-Single-Cycle Pulses<sup>1</sup>**

AYSAN BAHARI, Texas AM University, ALEXANDRA ZHDANOVA, Kitty Hawk , MARIIA SHUTOVA, Berkeley Lab, ALEXEI SOKOLOV, Texas AM University — Ultrashort laser pulses are widely used to study the properties of the material and fabricate complex structures for a variety of applications. These pulses usually are generated with mode-locked lasers, by passive or active mode-locking. There are also other methods that involve compressing slightly longer pulses by applying several experimental techniques. Here, we demonstrate producing these high-demand near single-cycle pulses, utilizing our coherently-generated Raman sidebands. Our femtosecond pulses consist of a few optical cycles and allow not only synthesis of shaped waveforms with tunable amplitude and frequency as a function of time, but also an arbitrary electric field as a function of time (not necessarily sinusoidal). These pulses are perfect candidates for direct control of electron trajectories in photoionization and high harmonic generation (HHG) processes. We aim to use our pulses to study multi-photon ionization in atomic and molecular gases.

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