Title	**Compact, high-repetition-rate OPCPA system for high harmonic generation**
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Abstract	A compact, high-repetition rate optical parametric chirped pulse amplifier system emitting CEP-stable, few-cycle pulses with 10 µJ of pulse energy is reported for the purpose of high-order harmonic generation. The system is seeded from a commercially available, CEP-stabilized Ti:sapphire oscillator, delivering an octave-spanning spectrum from 600-1200 nm. The oscillator output serves on the one hand as broadband signal for the parametric amplification process and on the other hand as narrowband seed for an Ytterbium-based fiber preamplifier with subsequent main amplifiers and frequency doubling. Broadband parametric amplification up to 17 µJ at 200 kHz repetition rate was achieved in two 5 mm BBO crystals using non-collinear phase matching in the Poynting-vector-walk-off geometry. Efficient pulse compression down to 6.3 fs is achieved with chirped mirrors leading to a peak power exceeding 800 MW. We observed after warm-up time a stability of < 0.5 % rms over 100 min. Drifts of the CE-phase in the parametric amplifier part could be compensated by a slow feedback to the set point of the oscillator phase lock. The CEP stability was measured to be better than 80 mrad over 15 min (3 ms integration time). The experimentally observed output spectra and energies could be well reproduced by simulations of the parametric amplification process based on a (2+1)-dimensional nonlinear propagation code, providing important insight for future repetition rate scaling of OPCPA systems. The system is well-suited for attosecond science experiments which benefit from the high repetition rate. First results for high-order harmonic generation in argon will be presented.
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