Abstract Submitted
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High repetition rate source of narrowband extreme-ultraviolet harmonics for time-resolved ARPES[1] HE WANG, YIMING XU, STEFAN ULONSKA, PREDRAG RANITOVIC, JOSEPH ROBINSON, ROBERT KAINDL, Lawrence Berkeley National Laboratory — We present a highly efficient table-top source of extreme ultraviolet (XUV) femtosecond pulses operating at 50-kHz repetition rate. A bright XUV source flux of $3\text{x}10^{13}$ photons/s is generated at 22.3 eV by driving high-harmonic generation with the ultraviolet second-harmonic of a laser amplifier focused tightly into Kr gas. The conversion efficiency ($5\text{x}10^{-5}$) is enhanced by two orders-of-magnitude in this cascaded scheme, exceeding dipole wavelength scaling and evidencing enhanced phase matching conditions as confirmed by simulations. Importantly, the spectral structure enables the direct, high-contrast isolation of a single, narrowband harmonic with 72 meV linewidth. The high repetition rate, narrow bandwidth, and high flux (10^{11}-10^{12} ph/s at the sample) of this source is ideal for time-resolved photoemission or nanoscale imaging. First applications in time- and angle-resolved photoemission (trARPES) will be discussed.

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