

SCIENCE AND TECHNIQUES OF ULTRA-FAST ELECTRON AND PHOTON SOURCES

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Abstract

The author will review the remarkable world-wide field and activities of ultra-fast and exotic electron and photon sources and the science that can be accomplished through their use, as well as several specialized new sources of accelerated electrons. The areas to be covered include: the generation, manipulation and measurement of few-fs to sub-fs ultra-high phase space density electron bunches (10-1000 MeV) with ultra-intense waveform-controlled few-cycle light; the generation and measurement of few-fs to sub-fs hard X-ray pulses from the interaction of high-density electron bunches with periodic structures; laser wakefield accelerators and other exotic emerging sources; the use of these devices for science, including control and real-time observation of electron dynamics on atomic & sub-atomic scales.

**CONTRIBUTION NOT
RECEIVED**