

1. Record Nr.	UNINA9910392721803321
Autore	Kessel Alexander
Titolo	Generation and Parametric Amplification of FewCycle Light Pulses at Relativistic Intensities [[electronic resource] /] / by Alexander Kessel
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2018
ISBN	3-319-92843-0
Edizione	[1st ed. 2018.]
Descrizione fisica	1 online resource (XXII, 165 p. 86 illus. in color.)
Collana	Springer Theses, Recognizing Outstanding Ph.D. Research, , 2190-5053
Disciplina	621.36
Soggetti	Lasers Photonics Quantum optics Microwaves Optical engineering Optics, Lasers, Photonics, Optical Devices Quantum Optics Microwaves, RF and Optical Engineering
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Introduction -- Fundamentals -- The Petawatt Field Synthesizer System -- Seed Generation Schemes -- OPCPA Experiments with Two OPA Stages -- Preparations for a Third OPA Stage -- Summary and Outlook.
Sommario/riassunto	This book reports on the development of a pioneering light source architecture of the so-called Petawatt Field Synthesizer (PFS) system, which is based on short-pulse pumped, optical parametric chirped pulse amplification (OPCPA), driven by a homemade, 1-ps diode-pumped Yb:YAG. At a few-cycle pulse duration of the amplified pulses, this architecture yields record levels of peak power and temporal contrast, the latter boasting a 100-times faster rise time from the noise level to peak intensity of the pulse compared to conventional laser systems. This allows investigation of the true laser–solid interaction without premature plasma expansion and without lossy pulse cleaning by e.g. plasma mirrors. The book describes several concepts for the

generation of broadband, high-energy and high-contrast seed pulses, as well as the OPCPA development, few-cycle pulse compression and contrast characterization in a concise and insightful manner. The theory chapter serves as an excellent and accessible primer on OPCPA and other nonlinear interactions, while the experimental parts provide an excellent description of the challenges of developing such a novel architecture and some of the innovative solutions to overcome them.

---