Principles of Lasers

FOURTH EDITION

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Front cover photograph: The propagation of an ultraintense pulse in air results in self-trapping of the laser beam. The rich spectrum of colors produced is the result of the high intensity ($\approx 10^{14}$ W/cm^2) within the self-focused filament, producing nonlinear phenomena such as self-phase modulation, parametric interactions, ionization, and conical emission due to the beam collapse. The rainbowlike display with its sequenced color is due to diffraction of the different colors (copyright 1998 William Pelletier, Photo Services, Inc.).

Back cover photograph: Interaction of an ultraintense ($\approx 10^{20}$ W/cm^2) laser pulse with a target consisting of plastic and aluminum layers. The 450-fs pulse, with peak power of 1200 TW, is produced by the petawatt laser at the Lawrence Livermore National Laboratory. Numerous nonlinear and relativistic phenomena are observable including copious second harmonic generation (green light in photo) (courtesy of M. D. Perry, Lawrence Livermore National Laboratory).

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