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Physics : Quantum Optics, Quantum Electronics, Nonlinear Optics

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Photonics

Linear and Nonlinear Interactions of Laser Light and Matter

- **Nonlinear phenomena play a more and more important role for everybody using the laser "as a tool"**
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Since the invention of the laser in 1960 there has been an enormous increase in the number of applications of this newly available light and its spectacular properties, and there is no end to this development in sight. In many fields of science, technology and medicine laser photons are the driving force of progress. In the near future we will probably experience a further rapid development in this field as a result of the widespread industrial production of semiconductor diode lasers and new nonlinear optical materials. Light from the new lasers may become even cheaper than that from light bulbs. Thus, laser optic devices will influence all sectors of private and public life. The highpower, highbrightness, narrowbandwidth, goodcoherence, special polarization and/or short pulses of laser light beams enable new applications. Many of these processes will be based on nonlinear optical interactions of the laser light with suitable optical material. In these interactions the material is modified by the incident light. The light is then in turn modified by the modified matter. Finally, the nonlinear modification of light as a function of other light becomes possible. Light is modified by light. To use laser light in this sense in science, technology and medicine, knowledge from different fields of physics, chemistry and engineering is necessary.

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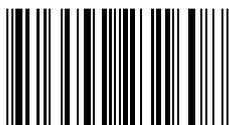
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