P. Günter, J.-P. Huignard (Editors)

Photorefractive Materials and Their Applications I

Fundamental Phenomena

1988. 134 figures. XVI, 295 pages. (Topics in Applied Physics, Volume 61). Hard cover DM 119,–. ISBN 3-540-18332-9

This is the first of two volumes that review, for the first time, all major aspects of photorefractive effects and their applications.

The fundamental phenomena leading to photoinduced changes of refractive index, the materials requirements and experimental results on a variety of photorefractive materials are discussed and the most recent theoretical models describing these phenomena are presented.

Interest in photorefractive materials has increased in recent years mainly because of their potential for nonlinear optical devices and for optical signals processing applications. Most of these applications are reviewed in the second volume devoted to this topic.

P. Günter, J.-P. Huignard (Editors)

Photorefractive Materials and Their Applications II

Applications

1988. 227 figures. Approx. 330 pages. (Topics in Applied Physics, Volume 62). Hard cover, in preparation. ISBN 3-540-19202-6

Springer-Verlag
Berlin Heidelberg New York London Paris Tokyo

sb. 8569/4/4h

Springer

FORTHCOMING PAPERS

Combined Self-Phase Modulation and Amplification of Femtosecond Light Pulses

P. Heist, W. Rudolph (German Democratic Republic)

The influence of depletable amplification, group velocity dispersion and self-phase modulation due to Kerr-type nonlinearity on pulse shaping in femtosecond pulse amplification has been calculated. With gain depletion which is typical for the last stage of multi-stage amplifiers, spectral broadening occurs which, under certain conditions, can be utilized for pulse compression. This spectral broadening as well as a predicted spectral shift is compared with experimental results.

Resonant Raman Scattering of Vibrationally Highly Excited Supersonic-Jet-Cooled SO_2 Molecules

Yu. G. Vainer, N. V. Gruzdev, A. A. Puretzky, E. G. Sil'kis, V. D. Titov (USSR)

The resonant Raman scattering spectra of vibrationally highly excited SO_2 molecules with the vibrational energy of $\sim 3.7 \times 10^4$ cm $^{-1}$ exhibit relatively wide (~ 50 cm $^{-1}$) structurized bands. This spectral width is attributed to the mixing of vibrational levels of the ground electronic state $^1A_1$ due to a non-adiabatic interaction with the vibrational levels of the electronically excited state $^1B_1$.

IR Diode Laser Measurements of the NH_3($_2$) Band at Different Temperatures

H. Neckel, J. Wolfrum (F. R. Germany)

A tunable IR diode laser system has been to measure the temperature dependence of the line strength and the pressure dependence of the nitrogen broadened linewidth of the aQ(6,6) and aQ(7,7) ammonia absorption lines up to temperatures of 660 K. The behavior of the line strength and the pressure dependence of the linewidth coincide with the theoretical predition while the temperature dependence of the linewidth differs significantly from the predictions of the hard core model.

Photoacoustic Detection of NH_3 in Power Plant Emission with a CO_2 Laser

A. Olafsson, M. Hammerich, J. Bülow, J. Henningsen (Denmark)

The paper describes a photoacoustic spectrometer for detection of NH_3 in power plant emission with a detection limit below 1 ppm. The radiation source is a tunable CO_2 waveguide laser, and detection is performed at reduced pressure, where the vibration-rotation lines of NH_3 are essentially Doppler broadened. Immunity against interference is ensured by recording a characteristic spectral profile, and problems associated with the high concentration of CO_2, and the associated line center absorption are eliminated by utilizing the effect of kinetic cooling on the photoacoustic phase. A computerized spectrometer has been constructed and tested under realistic conditions at a Danish power plant operating a test facility for selective non-catalytic reduction of NO_x. Results of this field test are given.

On the Possibility of Velocity Monochromatization of Atomic Beams Below Recoil Velocity

V. I. Balykin (USSR)

The paper is concerned with a new method of atomic beam monochromatization based on the tunnelling of atoms through a potential barrier formed by laser radiation.

New Nonlinear Resonances in a Gas in the Presence of a Strong Optical Field

E. V. Baklanov, V. P. Chebotayev, M. P. Staroselsky (USSR)

The present paper offers the solution to the problem of the nonlinear interaction of a weak standing wave with a two-level gas in the field of a strong travelling wave. It turns out that a number of new nonlinear resonances with a homogeneous width arise on the background of linear absorption.

Applied Physics A 49, No. 1 (1989)

Solid-State Ionics