

FORTHCOMING PAPERS

New FIR Laser Lines from Optically Pumped DCOF

H. Jones (F. R. Germany), B. Davies, W. Lewis-Bevan (England)

Twenty FIR laser lines with wavelengths between 146 and μm have been observed from deuterated formyl fluoride (DCOF) optically pumped with isotopic CO_2 lasers. Tunable diode laser measurements on the ν_4 band of DCOF were combined with earlier high precision spectroscopic data on the ν_3 and ν_4 bands, and enabled identification of the transitions responsible for 9 of the new FIR lines.

Picosecond Spectroscopy of Intermolecular Interactions in Dye Solutions

A. N. Rubinov, B. A. Bushuk, A. A. Murav'ov, A. P. Stupok (USSR)

Some new experimental data on the time development of ultrashort superfluorescence (SF) in the dye solution are presented. The correlation between temporal behaviour change and the change of the spectral and spatial intensity distribution gives the direct evidence to the important role of selffocusing phenomenon in the formation of the ultrashort SF pulse synchronized with the pumping one. The orientational relaxation of solvent molecules in the dye solution not only influences the duration of the dye SF via the selffocusing mechanism but also causes the temporal change of spontaneous emission spectrum. At least two different relaxation times were found in the fluorescence spectrum of the dye in several polar solutions.

Diffraction Efficiencies of Evanescent-Wave Holograms.

W. Biehlig, U. Langbein, F. Lederer (German Democratic Republic)

In contrast to previous models diffraction efficiencies of evanescent-wave holograms are calculated within the framework of a slab model that takes into account the finite thickness of the recording medium. This modification leads to characteristic diffraction efficiency oscillations with respect to reconstruction angle and medium thickness as well. One obtains higher diffraction efficiency maxima and pseudo-optical tunnelling. The analysis covers TE-polarized fields.

Sensitive Laser Spectroscopy on Trapped Barium Ions by Quenching with Hydrogen

W. Ruster, J. Bonn, P. Peuser, N. Trautmann (F. R. Germany)

The sensitivity of laser spectroscopy on barium ions stored in a radio frequency quadrupole trap was drastically increased by using hydrogen for quenching the optically pumped metastable states. The attained fluorescence intensity per ion permits the detection of single ions. The method will be applied to environmental studies on actinides.

Resonant Upconversion of $\lambda = 1.06 \mu\text{m}$ Radiation in Rubidium Vapors

V. A. Kiyashko, A. K. Popov, V. P. Timofeev, G. V. Yurov (USSR)

The experimental results on upconversion of $\lambda = 1.06 \mu\text{m}$ radiation to the near ultraviolet in rubidium vapors providing 12 % photon efficiency are reported under two-photon resonance of the converted and pump sum-frequency.

Laser Frequency Dependent Kinetics of cw Laser Induced Reactions

R. N. Zitter, D. F. Koster, A. Ringwelski, A. Cantoni (USA)

$\text{CF}_2\text{ClCF}_2\text{Cl}$ and ethyl acetate have absorption bands of similar width centered at the same frequency. Kinetics of the decompositions of these compounds by a cw CO_2 laser have been studied over a range of laser frequencies extending to 25 cm^{-1} below band center. At constant translational temperature and pressure, the $\text{CF}_2\text{ClCF}_2\text{Cl}$ rate constant changes by more than 200 with frequency, while the corresponding change for ethyl acetate is at most 3. The effect of laser frequency increases with increasing $\text{CF}_2\text{ClCF}_2\text{Cl}$ pressure, while the reverse is true in ethyl acetate. Arrhenius plots show activation energies independent of both frequency and pressure.

K.-H. Löcherer, C. D. Brandt

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