

P. MARK

Harvey's Resort Hotel

#18.

# **TECHNICAL DIGEST**



**INTERNATIONAL CONFERENCE  
ON**

**LASERS '93**

**DECEMBER 6-9, 1993  
HARVEY'S RESORT HOTEL  
LAKE TAHOE, NEVADA**

## ROOM 3 SESSION TE

### Free Electron Lasers

Chairman: D. Harris, Rockwell Intl.

#### TE.1 Invited. Materials Science on the Vanderbilt Free-Electron Laser: First Results and Ongoing Programs *N. Tolk, Vanderbilt Univ.*

New results using the Vanderbilt Free-Electron Laser are presented: (a) super-accurate heterojunction band discontinuity measurements, (b) two-photon characterization of the indirect gap of germanium, and (c) wavelength-dependent growth of diamond films.

#### TE.2 Free Electron Laser Based on Z-Pinch Structured by a Standing Light Wave *T.V. Vishnitskaya, V.I. Klimov, V.V. Korobkin and M.Yu. Romanovsky, Gen. Phys. Inst., Moscow.*

Z-pinch modulated by the ponderomotive force from the standing laser wave is structured. Drift electrons are undulated due to the strong modulated induction electric field along the pinch. Short wavelength free electron lasers can be achieved.

#### TE.3 Third Harmonic Characteristics in Free Electron Laser *E.S. Fu and X.X. Li, Shanghai Inst. of Optics and Fine Mechanics.*

The method of perturbation to calculate electron distribution function is developed, the evolution equation of the third-harmonic laser field is obtained, and the third harmonic characteristics are discussed under the first order approximation.

#### TE.4 Optical Diagnostic System for RF-FEL *E.S. Fu, Y.Z. Wang, B. Wang, L. Chen, G.R. Shen and Z.J. Wang, Shanghai Inst. of Optics and Fine Mechanics.*

This optical diagnostic system may be used to measure many optical parameters, such as energy, power, macropulse length, spectra, spectral bandwidth, quality of light beam for RF-FEL, etc.

## ROOM 4 SESSION TF

### Dye Lasers I

Organizers: F.J. Duarte, Kodak & J.J. Ehrlich, MICOM.  
Chairman: F.J. Duarte, Kodak

#### TF.1 Invited. Dye-Doped Silicate Matrices *E.J.A. Pope, MATECH.*

Efforts to encapsulate optically-active organic dye molecules in sol-gel derived hosts are reviewed. The potential for utilizing gel-polymer composites for solid-state lasers, photochromic devices, and microlens arrays are presented.

#### TF.2 Invited. The Solid State Dye Laser Program at the U.S. Army Missile Command *W.E. Davenport, U.S. Army, MICOM.*

The solid-state dye laser program at MICOM is described and discussed.

#### TF.3 Invited. Generation of Frequency Tunable Femtosecond Laser Pulses *A. Penzkofer and M. Wittmann, Univ. Regensburg.*

The generation of frequency tunable fs pulses will be reviewed. Specific consideration will be given to sub-100fs tunable pulse generation in a passive mode-locked soliton-like dye laser by birefringent filter tuning.

## ROOM 5 SESSION TG

### Laser Spectroscopy II

Organizer & Chairman: P. Misra, Howard Univ.

#### TG.1 Invited. Using Laser-Induced Fluorescence to Study Molecules of Atmospheric Importance *R.A. Copeland, SRI Intl.*

Vibrationally and electronically excited  $O_2$  and OH are studied by laser-induced fluorescence. In  $O_2$ , predissociation in the  $B^3\Sigma_u^-$  state is examined. In OH, ground-state vibrational energy transfer is investigated via a two-laser technique.

#### \*TG.2 Invited. Laser-Induced Fluorescence Spectroscopy of Jet-Cooled Free Radicals *P. Misra, Howard Univ.*

Detailed vibronic and rotational analyses of laser-induced fluorescence spectra of several jet-cooled organic free radicals, namely alkoxy, alkylthio, benzyl and phenyl, have helped characterize these radicals spectroscopically.

#### TG.3 High-Resolution Laser Spectroscopy of Atomic Nitrogen *P. Cangiano, M. de Angelis, L. Gianfrani, G. Pasce and A. Sasso, Univ. di Napoli.*

We report the first Doppler-free investigation of atomic nitrogen based on semiconductor diode laser emitting in the near infrared.

## ROOM 6 SESSION TH

### Quantum Optics I

Organizer & Chairman: M.O. Scully, Texas A&M and Max-Planck Inst. of Quantum Optics.

#### TH.1 Invited. Physics With Trapped Atoms and Neutrons *N.F. Ramsey, Harvard Univ.*

Accurate measurements of atomic hydrogen trapped in a hydrogen maser are described. Measurements with neutrons trapped in material bottles or inhomogeneous magnetic fields are also discussed.

#### TH.2 Invited. Tunneling is Observed to be Superluminal, But Causality is Not Violated *R.Y. Chiao, Univ. of Calif., Berkeley*

Measurements of tunneling time for photons through a tunneling barrier show that Gaussian wave packets emerge on the far side of the barrier superluminally. Einstein causality, however, is not violated. Various theories of the tunneling time are compared.

#### TH.3 Invited. Light Scattered From Two Atoms *W.M. Itano, U. Eichmann, et. al., Natl. Inst. of Standards and Tech.*

We have observed interference fringes, like those in the Young's slit experiment, in the fluorescence of two ions confined in a linear trap. Applications to "which path" and "quantum eraser" experiments will be discussed.