cavity by introducing a control field between the upper level and a neighboring third level. The corresponding Ginzburg–Landau equation and its solution will depend on the control field parameters, which can be tuned to control and select patterns.

TuH5 10:15am

Collapse and revival of wave-packet motion in optical lattices, Georg A. Raithel, W.D. Phillips, S.L. Rolston, *National Institute of Standards and Technology, Bldg. 221, Room A167, Gaithersburg, MD 20899-0001. E-mail: graithel@mailserver.nist.gov.* Coherent-state wave-packet oscillations of atoms in optical lattices are studied by measuring the photon redistribution between lattice beams, which is caused by the periodic acceleration of the atoms in the light-shift potentials. We observe and explain a variety of unusual collapse and revival structures.

TuI 9:00am–10:30am Room 103C

Joint Symposium on Laser-Induced Chemistry in Clusters: 1

John C. Miller, *Oak Ridge National Laboratory, Presider*

TuI1 9:00am (Invited)

Exploring cluster dynamics in the ultrafast time regime, A. Welford Castleman, Jr., *Department of Chemistry, Pennsylvania State University, 152 Davey Laboratory, University Park, PA 16802. E-mail: AWC@PSUVM.PSU.EDU.* Ultrafast pump-probe spectroscopy studies of isolated clusters in molecular beams are employed to investigate the influence of solvation on the dynamics of proton and hydrogen atom transfer in hydrogen-bonded systems. Studies through the $\tilde{C}'$ Rydberg state of ammonia have provided insight into the mechanisms, showing little effect of solvation for the case of proton transfer. On the other hand, the hydrogen transfer process displays significant dependence on the degree of clustering. In related studies at high laser fluence, Coulomb explosion processes are observed.

TuI2 9:30am (Invited)

Laser-assisted molecular beam deposition: chemistry within a cluster beam, Robert L. DeLeon, Paras N. Prasad, James F. Garvey, *Department of Chemistry, SUNY/Buffalo, Buffalo, NY 14260-3000. E-mail: Garvey@ACSU.BUFFALO.EDU.* A laser ablation cluster beam source has been employed to generate new bulk materials in the form of thin films. By controlling the molecular beam expansion, we are capable of "spraying" clusters of molecules onto a particular substrate that then coalesce to generate a uniform coating. Subtle modifications of laser fluence or expansion conditions result in dramatic changes in the chemical properties and morphology of the film generated (i.e., the formation of superconducting films, polymeric films, metal oxide: organic dye matrices, nanopowders, etc.).

TuI3 10:00am (Invited)

State-to-state vibrational relaxation in infrared-excited cluster ions, A.J. Stace, *School of Chemistry, Physics and Environmental Science, University of Sussex, Falmer Brighton BN1 9QJ, U.K. E-mail: tonys@sussex.ac.uk.* Using two separate IR lasers, we have attempted to characterize the increase in internal temperature that should accompany the partitioning of a single quantum of vibrational energy within small $SF_6.Ar_n^+$ and $SF_6.(NO)_n^+$ cluster ions. Accurate kinetic energy release measurements reveal that excitation of SF_6 to the υ_3 vibrational level is immediately followed by relaxation to a lower frequency mode.

TuJ 9:00am–10:30am Room 201A

Joint Symposium on Transient Spectroscopy: 1

Trevor Sears, *Brookhaven National Laboratory, Presider*

TuJ1 9:00am (Invited)

Development of infrared diode laser kinetic spectroscopy and its applications to formyl and silylene, Eizi Hirota, *The Graduate University for Advanced Studies, Hayama, Kanagawa 240-01, Japan. E-mail: hirota@soken.ac.jp.* An infrared diode laser spectrometer was modified by inserting a transient recorder in the signal detection circuity to make time-resolved observation possible. The system was applied to DCO (υ_3 band) and SiH_2 (5 μm bands) generated by the photolysis of CD_3CDO at 308 nm and of phenylsilane at 193 nm, respectively.

TuJ2 9:30am (Invited)

Infrared kinetic spectroscopy and radical kinetics, John DeSain, Anatoliy Kosterev, Graham P. Glass, Robert F. Curl, *Chemistry Department and Rice Quantum Institute, Rice University, Houston, TX 77005. E-mail: johonny@owlnet.rice.edu.* Recent work in the application of infrared kinetic spectroscopy to both high resolution spectroscopy and chemical kinetics is described. The application of infrared kinetic spectroscopy to kinetics is emphasized. Some of recent work in this area is the study of the reaction between propargyl radical and NO over a range of temperatures and pressures.

TuJ3 10:00am

Infrared absorption probing of Cl-atom reactions with hydrocarbons, Craig A. Taatjes, Jeffrey S. Pilgrim, John T. Farrell, *Sandia National Laboratories, Combustion Research Facility, Mail Stop 9055, Livermore, CA 94551-0969. E-mail: cataatj@ca.sandia.gov.* Several Cl + hydrocarbon reactions have been studied by a laser photolysis/infrared probe method in a temperature-controlled multipass cell. Measurements of Arrhenius parameters for Cl + ethene and of vibrational energy disposal in Cl + propene and allene provide thermochemical and mechanistic information about these reactions.

TuJ4 10:15am

Transient frequency-modulation spectroscopy of halocarbenes, Leah M. Ruslen, Trevor J. Sears,* Simon W. North,* Robert W. Field, *Massachusetts Institute of Technology, 77 Mass. Ave., Department of Chemistry, 2-013. E-mail: ruslen@mit.edu.* The transitory existence of carbenes and their weak electronic transitions offer a challenge for spectroscopists seeking to study these important organic reactive intermediates. We have utilized the high sensitivity provided by transient frequency-modulation absorption spectroscopy to record the rotationally resolved electronic transitions of halocarbenes, including bromomethylene (HCBr) and chloromethylene (HCCl).
**Brookhaven National Laboratory.*

TuK 9:00am–10:30am Room 201B

Symposium on Optical Methods of Atmospheric Sensing of Chemical Species: 1

Frank Tittel, *Rice University, Presider*

TuK1 9:00am (Invited)

Measurements of atmospheric greenhouse gases, E.J. Dlugokencky, J.W. Elkins, F.K. Tittel,* K.P. Petrov,* *INOAA Climate Monitoring & Diagnostic Laboratory, Boulder CO.* Climate change research requires high-precision measurements of greenhouse gases. Gas chromatographic techniques are precise but inefficient. Optical techniques could improve the efficiency of greenhouse gas measurements.
**Rice University.*

TuK2 9:30am (Invited)

Monitoring of natural and man-made gaseous pollutants with use of differential absorption Lidar, S. Svanberg, M. Andersson, H. Edner, P. Weibring, *Department of Physics, Lund Institute of Technology, S-221 00 Lund, Sweden. E-mail: sune.svanberg@fysik.lth.se.* Differential absorption lidar (dial) provides powerful mapping of atmospheric pollution concentrations and pollutant flux determinations. Examples from industrial and geophysical gas flow studies are given with emphasis on mercury and sulphur dioxide monitoring. Results from three ship-borne lidar campaigns