



## Laser spectroscopy V : proceedings of the fifth international conference, Jasper Park Lodge, Alberta, Canada, June 29-July 3, 1981 /

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Monografía

The Fifth International Conference on Laser Spectroscopy or VICOLS, was held at Jasper Park Lodge, in Jasper, Canada, June 29 to July 3, 1981. Following the tradition of the previous conferences in Vail, Megeve, Jackson Lake, and Rottach-Egern, it was hoped that VICOLS would provide an opportunity for active scientists to meet in an informal atmosphere for discussions of recent developments and applications in laser spectroscopy. The excellent conference facilities and remote location of Jasper Park Lodge in the heart of the Canadian Rockies, amply fulfilled these expectations. The conference was truly international, with 230 scientists from 19 countries participating. The busy program of invited talks lasted four days, with two evening sessions, one a panel discussion on Rydberg state spectroscopy, the other a lively poster session of approximately 60 post-deadline papers. We wish to thank all of the participants for their outstanding contributions and for preparation of their papers, now available to a wider audience. Our thanks go to the members of the International Steering Committee for their suggestions and recommendations. We are especially pleased to have held this conference under the auspices of the International Union of Pure and Applied Physics. VICOLS would not have been possible without the financial support of the Natural Sciences and Engineering Research Council of Canada, and the Office of Naval Research and Air Force Office of Scientific Research of the United States\* of America

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**Contenido:** Introduction: Progress and Perspectives in Laser Spectroscopy -- I. Fundamental Applications of Laser Spectroscopy -- Precision Spectroscopy and Laser Frequency Control Using FM Sideband Optical Heterodyne Techniques -- High Precision Laser Interferometry for Detection of Gravitational Radiation -- Optical Cavity Laser Interferometers for Gravitational Wave Detection -- A Proposed Two Photon Correlation Experiment as a Test of Hidden Variable Theories -- Lamb Shift Studies of  $\text{C}^{116+}$  -- II. Laser Spectroscopic Applications -- Selective Spectrum Simplification by Laser Level Labeling -- Resonance Ionization Spectroscopy: Counting Noble Gas Atoms -- Linewidth Characteristics of (GaAl) as Semiconductor Diode Lasers -- High Sensitivity Spectroscopy with Tunable Diode Lasers -- Detection of  $\text{O}_2$  Quadrupole Transitions and  $^{14}\text{C}$  -- New Techniques and Applications for High Resolution Tunable Submillimeter Spectroscopy -- Infrared Heterodyne Spectroscopy of Ammonia and Ethylene in Stars -- Stark Modulation Spectroscopy in the Visible Region -- Alignment Effects in Optogalvanic Spectroscopy -- Spin Polarization of Atoms by Laser Driven Two Photon and Excimer Transitions -- High Power Tunable Mid IR  $\text{NH}_3\text{-N}_2$  Laser and Its Application for Selective Interaction with Multiatomic Molecules -- III. Double Resonance -- Infrared-Ultraviolet Double Resonance Studies of Molecular Energy Transfer -- Pulsed Optical-Optical Double Resonance Spectroscopy of  $^7\text{Li}_2$  -- Double-Resonance Polarization Spectroscopy of the Caesium-Dimer ( $\text{Cs}_2$ ) -- Laser-Microwave Spectroscopy of  $\text{Li}^+$  Ions -- Laser-Induced Coherence Effects in Molecular Beam Optical-RF Double Resonance -- Probing the Dressed Molecule Energy Levels by Infrared-Radiofrequency Double Resonance -- Infrared-Microwave Double Resonance Spectroscopy of Tetrahedral Molecules Using a Tunable Diode Laser -- Molecular-Beam, Laser-RF, Double Resonance Studies of Calcium Monohalide Radicals -- IV. Collision-Induced Phenomena -- Collision-Induced Coherence in Four Wave Light Mixing -- Collisional Effects in Resonance Fluorescence -- Theory of Nonlinear Optical Resonances Induced by Collisions -- Polarization Intermodulated Excitation (POLINEX) Spectroscopy of Excited Atoms -- Laser Optical Pumping in Atomic Vapors with Velocity Changing Collisions -- Dressed Atom Approach to Line Broadening -- Collisional Processes Between Laser-Excited Potassium Atoms -- Noble Gas Induced Relaxation of the  $\text{Li } 3\text{S-}3\text{P}$  Transition Spanning the Short Term Impact Regime to the Long Term Asymptotic Regime -- Double Resonance Studies of Collision-Induced Transitions in a Molecular Beam -- V. Nonlinear Processes -- New Phenomena in Coherent Optical Transients -- Stimulated Raman Studies of  $\text{CO}_2$ -Laser-Excited  $\text{SF}_6$  -- Pulsed and CW Molecular Beam CARS Spectroscopy -- Spectroscopy of Higher Order CARS and CSRS -- Multiphoton Free-Free Transitions -- Precision Studies in 3-Level Systems -- Non-Linear Hanle Effect: Saturation Parameters and Power Enhancements in Lasers -- Atomic Coherence Effects in Resonant Four-Wave Mixing Spectroscopy of Sodium -- On the Validity of the Judd-Ofelt Theory for Two-Photon Absorption in the Rare Earths -- Molecular Spectroscopy Using Diode and Combined Diode- $\text{CO}_2$  Lasers -- Two-Photon Light Shift in Optically Pumped FIR Lasers -- Optical Stark Splitting of Rotational Raman Transitions -- VI. Rydberg States (Panel Discussion) -- Resonant Collisions Between Two Rydberg Atoms -- Rydberg Atoms in Magnetic Fields -- The Landau Limit of the Spectrum -- High Precision Energy Level Measurements in Helium -- Rydberg-Rydberg Interactions in Dense Systems of Highly Excited Atoms -- Turning Off the Vacuum -- Influence of the Earth Magnetic Field of the Photoionization Stark Spectrum of Excited Sodium Atoms -- Rydberg Superradiance -- Collision Effects with High-Rydberg State Atoms -- Perturbations in Rydberg Sequences Probed by Lifetime, Zeeman-Effect and Hyperfine-Structure Measurements -- VII. Methods of Studying Unstable Species -- Optogalvanic Spectroscopy in Recombination-Limited Plasmas with Color Center Lasers -- LIF Studies of Fragment Ions:  $\text{CH}^+$  and  $\text{CD}^+$  -- Sub-Doppler Spectroscopy of Some Gaseous Metal Oxide Molecules -- The Infrared Spectrum of  $\text{H}_3^+$  -- Infrared Vibrational Predissociation Spectroscopy of Small Molecular Clusters -- The Direct Photodissociation of van der Waals Molecules -- Optothermal Infrared Spectroscopy -- Laser Magnetic Double Resonance Spectra at 5 and 10? m -- High Sensitivity Color Center Laser Spectroscopy -- VIII. Cooling, Trapping and Control of Ions, Atoms, and

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