

Book review

Laser Spectroscopy VI

Editors: H. P. WEBER and W. LÜTHY

Springer Series in Optical Sciences, Vol. 40

Springer-Verlag, Berlin, Heidelberg, New York, Tokyo 1983
[pp. 442 + xvii, with 258 Figures]

The reviewed book contains abstracts of papers presented at the Sixth International Conference on Laser Spectroscopy held at Interlaken, Switzerland in 1983. Similarly as the previous volumes appearing in the Springer Series in Optical Sciences under the title *Laser Spectroscopy* (see *Optica Applicata* Vol. 15, No. 2, 1985 for the review of *Laser Spectroscopy V*), this book is filled with accounts of newest and highest quality research pushing still further the borders of resolution, sensitivity and applicability of laser spectroscopy.

The conference had an attendance of 310 scientists from 25 countries and 61 oral and 82 poster presentations constituted the busy program. The emphasis of the meeting was on the following topics:

- fundamental applications,
- novel spectroscopy,
- progress in new coherent sources,
- cooling, trapping and control of ions, atoms and molecules,
- surface and solid-state studies,
- spectroscopy of unstable species.

The conference proceedings consist of 18 parts dealing with various areas of laser spectroscopy and containing from 3 to 17 papers each. All in all, the abstract provide an exciting overview of the state-of-art research. The main drawback, at least for a reader from outside the field is the brevity of most reports, some of them being as short as a single page. Nevertheless, one must be aware that an attempt to edit a book of more extended abstracts of the contributions to SICOLS-83 would probably result in a volume of much larger size and in unavoidable delays or exclusions of some papers.

It is difficult to review, no matter how briefly, all the most important papers, just a few examples will only be given.

The trend of using laser spectroscopy as a tool to test basic physical principles is represented by the paper by BOUCHIAT et al. entitled *A Test of Electroweak Unification: Observation of Parity Violation in Cesium*. The authors state that, according to unified theories of electromagnetic and weak interactions, it should be feasible to detect a parity violation, i.e., some preference between right and left in some atoms. The experiments described in the paper provide indeed a statistically sound confirmation of this prediction.

Among the papers on novel spectroscopic applications of lasers, there is the paper by MLYNEK et al. on Raman heterodyne detection of NMR (see also J. MLYNEK et al., *Phys. Rev. Lett.* **50** (1983), 993). The technique described there is claimed to greatly surpass the previously known methods. The measurements on praseodymium ions in LaF_3 provide the

first spin echo studies of an electronically excited state and kilohertz precision is attained in the determination of NMR parameters.

A large part of the contributions presented at SICOLS dealt with new results obtained using high resolution spectroscopy. An example of such a study is that by RIEDLE et al. entitled *Doppler-free two-photon electronic spectra of large molecules with resolution near the natural linewidth*. The authors used the method of two-photon-spectroscopy with counter-propagating light beams, first proposed by VASILENKO et al. (JETP Lett. **12** (1970), 113) to study the archetype molecule of benzene. Due to the use of several improvements to the previously employed system of a cw ring dye laser and an external concentric cavity, the authors were able to measure single rotational lines in the benzene two-photon spectrum at pressures as low as 0.1 Torr. The attained resolution was as low as 10 MHz.

An interesting paper by BRUECK et al. reports on the use of surface photoacoustic wave spectroscopy. The new method relies on detection of surface acoustic waves (SAW) generated upon relaxation of energy optically absorbed in thin surface films. The technique has been found to be extremely sensitive and, e.g., for an adsorbed film of Rhodamine 590, absorption could be followed at the coverage of 10^{-3} – 10^{-4} of a monolayer.

A few interesting papers describe new sources of coherent light. Among them, HARRIS et al. deal with the problem of designing extreme ultraviolet lasers based on 20.7 nm transition in neutral Li or on 37.53 nm transition in Na. Generation of 35 nm coherent radiation obtained as the seventh harmonics of 248 nm KrF excimer laser pulses is described by BOKOR et al.

Summarizing, the collection of abstracts from SICOLS-83 provides an up-to-date coverage of many interesting aspects of laser spectroscopy. For a general reader this book lacks perhaps a wider accounting for many interesting developments which take place in the spectroscopy of solids, however, the scope of the Laser Spectroscopy conferences covers only some parts of this wide field of research.

Marek Samoć

Institute of Organic and Physical Chemistry
Technical University of Wrocław, Poland

6th European Optoelectronics

Fibre Optics — Lasers — Optics — Display Techniques

Following the increasing success of the first five European Optoelectronic meetings, and more particularly the 1985 one, OPTO 86 promises to be the largest symposium in this field. It will take place in Paris, at the Palais des Congrès, from May 13 to 15, 1986.

The focal point for research scientists, planners, consultants and users, OPTO 86, will corroborate the vitality and the maturity of the various branches of optoelectronics:

- FIBRE OPTICS:** The arrival of integrated optoelectronics components,
- LASERS:** Power transmission and study of ultra fast processes (10^{-9} , 10^{-12} s),
- OPTICS:** Mass production of new crystals for Alexandrite lasers, for example,
- DISPLAY TECHNIQUES:** Adjusting of analysis systems from sensor to display screen (high speed video).

General Secretariat:
ESI Publications
12, rue de Seine
75006 Paris
Tél.: 33(1) 325-58-74