

# METAL VAPOUR ION LASERS

Kinetic Processes and Gas Discharges



I. G. Ivanov • E. L. Latush • M. F. Sem

# Metal Vapour Ion Lasers Kinetic Processes And Gas Discharges

**Sabine Zange**



## **Metal Vapour Ion Lasers Kinetic Processes And Gas Discharges:**

*Metal Vapour Ion Lasers* Igor' Grigor'evich Ivanov, Evgeniï Leonidovich Latush, Miroslav Frantševich Sëm, 1996-09-20 Metal vapour ion lasers are a mature class of gas laser for which a number of applications has developed in recent years This is the first book to appear in the English language on this topic and concentrates on the physical processes which occur in the laser in particular the kinetic processes which are responsible for the pumping of excited ion levels and the production of population inversion The most important types of electrical discharges used in this class of laser are discussed in detail and all the major types of metal vapour ion laser are examined A highly useful appendix tabulates all the known transitions used in metal vapour ion lasers *Metal Vapour Ion Lasers Kinetic Processes and Gas Discharges* provides a much needed review of this important field It identifies current problem areas and points to future research directions It is an invaluable source for all those both in industry and academia working on the development or applications of metal vapour ion lasers and for all those involved in gas laser research It will also be of great interest to all those interested in the physics of gas discharges The authors and translators have been involved with some of the key advances in the field over recent years

*Gas Lasers* Masamori Endo, Robert F. Walter, 2018-10-03 Lasers with a gaseous active medium offer high flexibility wide tunability and advantages in cost beam quality and power scalability Gas lasers have tended to become overshadowed by the recent popularity and proliferation of semiconductor lasers As a result of this shift in focus details on modern developments in gas lasers are difficult to find In addition different types of gas lasers have unique properties that are not well described in other references Collecting expert contributions from authorities dealing with specific types of lasers *Gas Lasers* examines the fundamentals current research and applications of this important class of laser It is important to understand all types of lasers from solid state to gaseous before making a decision for any application This book fills in the gaps by discussing the definition and properties of gaseous media along with its fluid dynamics electric excitation circuits and optical resonators From this foundation the discussion launches into the basic physics characteristics applications and current research efforts for specific types of gas lasers CO lasers CO<sub>2</sub> lasers HF DF lasers excimer lasers iodine lasers and metal vapor lasers The final chapter discusses miscellaneous lasers not covered in the previous chapters Collecting hard to find material into a single convenient source *Gas Lasers* offers an encyclopedic survey that helps you approach new applications with a more complete inventory of laser options

*Metal Vapour Lasers* Christopher E. Little, 1999-03-12 *Metal Vapour Lasers* Christopher E Little University of St Andrews St Andrews Scotland Since the first successful demonstration of a metal vapour laser MVL in 1962 this class of laser has become widely used in a broad range of fields including precision materials processing isotope separation and medicine The MVLs that are used today have a range of impressive characteristics that are not readily available using other technologies In particular the combination of high average output powers pulse recurrence frequencies and beam quality available from green yellow Cu vapour lasers CVLs and Cu bromide lasers coupled with the

high quality multiwatt ultraviolet 265 289 nm radiation that can be produced using simple nonlinear optical techniques means that Cu lasers will continue to be important for many years *Metal Vapour Lasers* covers all the most commercially important and scientifically interesting pulsed and continuous wave CW gas discharge MVLs and includes device histories operating characteristics engineering kinetics commercial exploitation and applications Short descriptions of gas discharges and excitation techniques make this volume self consistent A comprehensive bibliography is also provided The greater part of this book is devoted to CVLs and their variants including new sealed off high power kinetically enhanced CVLs and Cu bromide lasers However many other self terminating MVLs are also discussed including the red AuVL green infrared MnVL and infrared BaVL Pulsed high gain high average power lasers in the UV violet 373 7 430 5 nm spectral regions are represented by Sr and Ca discharge afterglow recombination lasers The most commercially successful of the MVLs the CW UV blue cathodoluminescent He Cd ion laser is described Hollow cathode lasers are represented in two guises white light blue green red He Cd ion lasers and UV infrared Ne He Cu ion lasers This unique volume is an essential reference source for all those working on metal vapour lasers and all those who use them from postgraduate students through to experienced scientists and engineers It will also be extremely useful to all those working in other gas laser technologies and in gas discharge physics

*Lasers* Charles Blain, 2002 Developments in lasers continue to enable progress in many areas such as eye surgery the recording industry and dozens of others This book presents citations from the book literature for the last 25 years and groups them for ease of access which is also provided by subject author and titles indexes

**Atomic and Molecular Spectroscopy** Sune Svanberg, 2003-12-04 A wide ranging review of modern spectroscopic techniques such as X ray photoelectron optical and laser spectroscopy and radiofrequency and microwave techniques On the fundamental side the book focuses on physical principles and the impact of spectroscopy on our understanding of the building blocks of matter while in the area of applications particular attention is given to those in chemical analysis photochemistry surface characterisation environmental and medical diagnostics remote sensing and astrophysics The Fourth Edition also provides the reader with an update on laser cooling and trapping Bose Einstein condensation ultra fast spectroscopy high power laser matter interaction satellite based astronomy and spectroscopic aspects of laser medicine

*Pulsed Metal Vapour Lasers* C.E. Little, N.V. Sabotinov, 2012-12-06 A comprehensive up to date review of the physics and applications of a major class of laser the most important example of which is the copper vapour laser A collection of 50 papers written by the world's leaders in the field Papers cover the early history of pulsed metal vapour lasers the plasma kinetics and excitation mechanisms of self terminating and recombination metal vapour lasers beam quality issues for applications frequency harmonic generation for mid UV applications high precision processing of metals ceramics glasses and plastics using metal vapour lasers applications in medicine including oncology and dermatology applications in science such as spectroscopy and mass spectrometry A practical source of information on the physics engineering and applications of metal vapour lasers Audience

scientists teachers and graduate researchers working in the fields of gas lasers laser optics gas discharges optoelectronics and laser applications in industry science and medicine

**Fourteenth International Symposium on Gas Flow, Chemical Lasers, and High-Power Lasers** Krzysztof M. Abramski, Edward Franciszek Pliński, Wiesław Woliński, 2003  
Earlier conferences called International Symposium on Gas Flow and Chemical Lasers  
**Handbook of Laser Technology and Applications** Chunlei Guo, 2021-06-24 This comprehensive handbook gives a fully updated guide to lasers and laser systems including the complete range of their technical applications The first volume outlines the fundamental components of lasers their properties and working principles The second volume gives exhaustive coverage of all major categories of lasers from solid state and semiconductor diode to fiber waveguide gas chemical and dye lasers The third volume covers modern applications in engineering and technology including all new and updated case studies spanning telecommunications and data storage to medicine optical measurement defense and security nanomaterials processing and characterization

**High-brightness Metal Vapour Lasers** V. M. Batenin, V. V. Buchanov, A. M. Boichenko, M. A. Kazaryan, I. I. Klimovskii, E. I. Molodykh, 2016-12-12 High brightness metal vapor lasers have become the most bright and powerful in the visible spectral range among all existing laser types resulting in numerous applications ranging from purely fundamental research to practical application in large scale commercial problems such as isotope selection This book presents a full series of fundamental problems on the development of physical fundamentals and mathematical models for practical realization of a high power laser radiation on self contained transitions in metal atoms It is the first fundamental review on physics and the technique of high brightness metal vapor lasers  
**Atmospheric and Oceanic Optics**, 2008  
**Atomic and Molecular Pulsed Lasers V** Viktor Fedotov, Tarasenko, 2004 Proceedings of SPIE present the original research papers presented at SPIE conferences and other high quality conferences in the broad ranging fields of optics and photonics These books provide prompt access to the latest innovations in research and technology in their respective fields Proceedings of SPIE are among the most cited references in patent literature  
High-power gas lasers, 1975 International College of Applied Physics, 2020-11-26 This book presents lectures and seminars given at a Summer School organized by the International College of Applied Physics on the physics and technology and the industrial applications of high power gas lasers

*American Book Publishing Record*, 1997  
Nuclear Science Abstracts, 1975  
**Physics Briefs**, 1992  
**Laser Physics and Photonics** Vladimir L. Derbov, Leonid A. Melnikov, Lev Mikhailovich Babkov, 2001  
Optics and Spectroscopy, 2003  
**Surface Engineering of Metals** Tadeusz Burakowski, Tadeusz Wierzchon, 1998-12-23 Surface Engineering of Metals provides basic definitions of classical and modern surface treatments addressing mechanisms of formation microstructure and properties of surface layers Part I outlines the fundamentals of surface engineering presents the history of its development and proposes a two category classification of surface layers Discussions include the basic potential and usable properties of superficial layers and coatings explaining their concept interaction with other properties and the

significance of these properties for proper selection and functioning Part II provides an original classification of the production methods of surface layers Discussions include the latest technologies in this field characterized by directional or beam interaction of particles or of the heating medium with the treat surface      **Pulsed Gas Lasers** Gennadiĭ Andreevich Mesiāts, Gennadiĭ Andreevich Mesiāts, Vladimir Vasil'evich Osipov, Viktor Fedotovitch Tarasenko, 1995      **Scientific and Technical Aerospace Reports** ,1980

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