Handbook Of Ion Sources Hardback

Atom and Ion SourcesHandbook of Ion SourcesThe Physics and Technology of Ion SourcesFocused Ion Beams from Liquid Metal Ion SourcesElectron Cyclotron Resonance Ion Sources and ECR PlasmasElectron Impact Ion Sources for Charged Heavy IonsLarge Ion BeamsIndustrial Ion SourcesHigh Current Ion SourcesIon and Atomic Beams for Controlled Fusion and TechnologyIon and Atomic Beams for Controlled Fusion and TechnologyHigh Resolution Focused Ion Beams: FIB and its ApplicationsImproved Ion SourcesProceedings of the Second Symposium on Ion Sources and Formation of Ion Beams, Berkeley, California, 22-25 October 1974Physics and Technology of Plasma Ion SourcesSelection and Design of Ion Sources for Use at the Holifield Radioactive Ion Beam FacilityIon SourcesPerformance Correlation for Electron-bombardment Ion SourcesFundamentals of Ion-source OperationExtraction of Ions from Plasma Ion Sources and Primary Forming Ionic Bundles László Vályi Bernhard Wolf Ian G. Brown P. D. Prewett R Geller Grigory D. Shirkov A. Theodore Forrester Viacheslav V. Zhurin M.D. Gabovich M.D. Gabovich Jon Orloff M. D. Gabovich Huashun Zhang Harold R. Kaufman Harold R. Kaufman M. D. Gabovich

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the handbook of ion sources delivers the data needed for daily work with ion sources it also gives information for the selection of a suitable ion source and ion production method for a specific application the handbook concentrates on practical aspects and introduces the principle function of ion sources the basic plasma parameters are defined and discussed the working principles of various ion sources are explained and examples of each type of ion source are presented with their operational data tables of ion current for various elements and charge states summarize the performance of different ion sources the problems related to the production of ions of non gaseous elements are detailed and data on useful materials for evaporation and ion source construction are summarized additional chapters are dedicated to extraction and beam formation ion beam diagnosis ion source electronics and computer codes for extraction acceleration and beam transport emittance and brilliance are described and space charge effects and neutralization discussed various methods for the measurement of current profile emittance and time structure are presented and compared intensity limits for these methods are provided for different ion energies typical problems related to the operation of ion source plasmas are discussed and practical examples of circuits are given the influence of high voltage on ion source electronics and possibilities for circuit protection are covered the generation of microwaves and various microwave equipment are described and special problems related to microwave operation are summarized the handbook of ion sources is a valuable reference on the subject of benefit to practitioners and graduate students interested in accelerators ion implantation and ion beam techniques

the first edition of this title has become a well known reference book on ion sources the field is evolving constantly and rapidly calling for a new up to date version of the book in the second edition of this significant title editor ian brown himself an authority in the field compiles yet again articles written by renowned experts covering various aspects of ion source physics and technology the book contains full chapters on the plasma physics of ion sources ion beam formation beam transport computer modeling and treats many different specific kinds of ion sources in sufficient detail to serve as a valuable reference text

provides an up to date review and analysis of liquid metal ion sources and their applications the contents range from a discussion of the fundamental physics underlying operation of the liquid metal ion sources through the technical details of their construction and manufacture to their performance characteristics their use in focused ion beam systems is covered in detail including a discussion of the fundamentals of ion optical focusing column design and the various microengineering applications

acknowledged as the founding father of and world renowned expert on electron cyclotron resonance sources richard geller has produced a unique book devoted to the physics and technicalities of electron cyclotron resonance sources electron cyclotron resonance ion sources and ecr plasmas provides a primer on electron cyclotron phenomena in ion sour

presently many different types of ion sources exist worldwide for producing highly charged ions the object of the present book is the treatment of electron impact ion sources like ecr electron qyclotron resonance ion sources ebis electron b eam ion s ources ebit electron b eam ion irap and eris electron ring ion s ources which altogether are able to produce ions of high charge states this criterion delimits the book according to classic ion sources which as a rule can deliver high currents of low charged ions in the last decades there has been an intense development and building up of sources of highly charged ions the first impetus to the building of such sources came from heavy ion accelerator centers since the effectiveness of a heavy ion accelerator is predominantly determined by the available ion sources thereby the critical criterions for the operation of an ion source are the charge state distribution of the ions produced and the intensity of the extracted ion currents besides the employment of sources of highly charged ions in accelerator centers such sources increasingly are inserted separately from accelerators for basic investigations in atomic physics surface physics and related areas

magneto solid mechanics francis c moon comprehensively treats in monograph form problems directly related to magneto solid mechanics provides a thoroughly modern examination of the stresses dynamics and stability of magneto mechanical devices such as superconducting magnets levitated vehicles magnetic mass drivers electromagnets and actuators over 60 specific coupled magneto mechanical problems are discussed and analyzed and well over 200 illustrations are included physical concepts are introduced early along with summaries of the basic equations of magneto solid mechanics magnetic forces and energy 1984 0 471 88536 3 436 pp chaotic vibrations an introduction for applied scientists and engineers francis c moon a valuable work which helps to translate new mathematical ideas in non linear dynamics and chaos into a language that engineers and scientists can understand as such it provides specific examples and applications of chaotic dynamics in the physical world and describes how to perform both computer and physical experiments in chaotic dynamics new ideas in dynamics are explained such as poincare maps fractal dimensions and lyapunov exponents includes a glossary of chaotic dynamics terms a list of computer experiments and an appendix of details for a demonstration experiment 1987 0 471 85685 1 300 pp

due to the large number of uses of ion sources in academia and industry those who utilize these sources need up to date and

coherent information to keep themselves abreast of developments and options and to chose ideal solutions for quality and cost effectiveness this book written by an author with a strong industrial background and excellent standing is the comprehensive guide users and developers of ion sources have been waiting for providing a thorough refresher on the physics involved this resource systematically covers the source types components and the operational parameters

the concept of high current ion source is both relative and evolutionary within the domain of one particular kind of ion source technology a current of microamperers might be high while in another area a current of 10 amperes could low even within the domain of a single ion source type what is considered high current performance today is routinely eclipsed by better performance and higher current output within a short period of time within their fields of application there is a large number of kinds of ion sources that can justifiably be called high current thus as a very limited example only pigs freemen sources ecr sources duoplasmatrons field emission sources and a great many more all have their high current variants high current ion beams of gaseous and metallic species can be generated in a number of different ways ion sources of the kind developed at various laboratories around the world for the production of intense neutral beams for controlled fusion experiments are used to form large area proton deuteron beams of may tens of amperes and this technology can be used for other applications also there has been significant progress in recent years in the use of microwave ion sources for high current ion beam generation and this method is likely to find wide application in various different field application finally high current beams of metal ions can be produced using metal vapor vacuum arc ion source technology after a brief consideration of high current ion source design concepts these three particular methods are reviewed in this paper

translated from the russian studies the physical and technical fundamentals of modern ion sources sputtering processes ion implantation and atomic beams to present their current and future technological applications no index annotation copyrighted by book news inc portland or

a beam of ions in the fonn of canal rays was first observed in 1886 by e goldstein the first ion source was invented by j j thomson in 1910 this ion source became the basis for the first widespread application of ion sources in mass spectrographs and mass spectrometers the second important application of ion sources is ion accelerators which since the beginning of the 1930s have been employed in research on nuclear reactions and are now used in industry and medicine a third application of ion sources is in systems for isotope separation and re search on the interaction of atomic particles with solids 1940s the result of this research and development is the use of ion sources in semiconductor doping decontamination of surfaces and

micromachining of surfaces 1960s and 1970s which is a fourth area of applications for ion sources the heating of plasmas in magnetic confinement devices to thennonuclear temperatures 100 1000 mk with the aid of megawatt beams of hydrogen and deuterium ions and atoms has become a fifth promising area of application for ion sources which can produce ion beams with steady state currents of up to 100 a finally experimental and industrial research are under way on the alloying of metals and the fabrication of coatings which greatly improve the physical and chemical properties of metals these coatings can increase the hardness high temperature corrosion resistance and wear resistance of metals and can enhance or reduce friction etc

in this book we have attempted to produce a reference on high resolution focused ion beams fibs that will be useful for both the user and the designer of fib instrumentation we have included a mix of theory and applications that seemed most useful to us the field of fibs has advanced rapidly since the application of the first field emission ion sources in the early 1970s the development of the liquid metal ion source lmis in the late 1960s and early 1970s and its application for fibs in the late 1970s have resulted in a powerful tool for research and for industry there have been hundreds of papers written on many aspects of lmis and fibs and a useful and informative book on these subjects was published in 1991 by phil prewett and grame mair because there have been so many new applications and uses found for fibs in the last ten years we felt that it was time for another book on the subject

contents brief information on certain elemental processes occurring in plasma ion sources plasma ion sources basic physical processes designs properties and parameters the mass spectrum and charge composition of beams extracted from plasma ion sources plasma sources of ions of refractory metals extraction of ions and the primary formation of ion beams beam propagation and a study of beams penetration of a plasma from an ion source into a vacuum energy of the ions leaving the source plasma the vibrational properties of a plasma and their influence on the processes in plasma ion sources and neutralized ion beams

the holifield radioactive ion beam facility now under construction at the oak ridge national laboratory will use the 25 mv tandem accelerator for the acceleration of radioactive ion beams to energies appropriate for research in nuclear physics negative ion beams are therefore required for injection into the tandem accelerator because charge exchange is an efficient means for converting initially positive ion beams to negative ion beams both positive and negative ion sources are viable options for use at the facility the choice of the type of ion source will depend on the overall efficiency for generating the

radioactive species of interest although direct extraction negative ion sources are clearly desirable the ion formation efficiencies are often too low for practical consideration for this situation positive ion sources in combination with charge exchange are the logical choice the high temperature version of the cern isolde positive ion source has been selected and a modified version of the source designed and fabricated for initial use at the facility because of its low emittance relatively high ionization efficiencies and species versatility and because it has been engineered for remote installation removal and servicing as required for safe handling in a high radiation level isol facility the source will be primarily used to generate ion beams from elements with intermediate to low electron affinities prototype plasma sputter negative ion sources and negative surface ionization sources are under design consideration for generating radioactive ion beams from high electron affinity elements the design features of these sources and expected efficiencies and beam qualities emittances will be described in this report

while dealing with the design and operation of ion sources this book additionally discusses the physics of ion formation of the various elements with different charge states and charge neutralization ion selection and beam diagnostics are equally included and the presentation of the necessary equations and diagrams for the various parameters makes this a useful handbook for ion sources

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