Nuclear Measurements, Techniques and Instrumentation

Industrial Applications

Plasma Physics and Nuclear Fusion

1990–2002
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WERE ORIGINALLY BLANK
This catalogue lists all sales publications of the International Atomic Energy Agency dealing with Nuclear Power and Nuclear Fuel Cycle and Waste Management, and issued during the period 1 January 1990 and 31 July 2002. Some earlier titles which form part of an established series or are still considered of importance have been included. Most publications are issued in English, though some are also available in other languages than English. This is noted as A for Arabic, C for Chinese, F for French, R for Russian and S for Spanish before the relevant ISBN number.

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# TABLE OF CONTENTS

NUCLEAR MEASUREMENTS, TECHNIQUES AND INSTRUMENTATION ........................................ 5

Physics ......................................................................................................................... 6
Dosimetry (Techniques) .............................................................................................. 11
Nuclear Analytical Techniques ..................................................................................... 14
Research Reactors and Particle Accelerators (Applications) ........................................ 17
Nuclear Data .................................................................................................................. 20

INDUSTRIAL APPLICATIONS ...................................................................................... 25

Radiation Processing .................................................................................................... 26
Tracers ............................................................................................................................. 27

PLASMA PHYSICS AND NUCLEAR FUSION ........................................................... 29

Alphabetical Index.......................................................................................................... 39
Order Form ..................................................................................................................... 41
This report assesses the market potential and economics of the use of nuclear energy in various non-electric applications, including district heating, the supply of process heat, water desalination, ship propulsion and outer space applications. It also gives an overview of promising innovative applications, such as fuel synthesis (including hydrogen production) and oil extraction.


Expected publication date: Autumn 2002

STI/DOC/010/410 (approx. 242 pp., 29 figures)
ISBN 92–0–115402–X
Price: not yet set
ATOMIC AND PLASMA–MATERIAL INTERACTION DATA FOR FUSION

The purpose of this series of annually published volumes of which the earlier issues were supplements to the Nuclear Fusion journal is to publish original contributions and review articles containing high quality data on the atomic and plasma–material interaction processes of interest to thermonuclear fusion research. The scientific scope of the series includes the topics of elementary atomic collision processes in fusion plasmas, involving photons, electrons, ions, atoms and molecules, the collision processes of plasma particles with surfaces of fusion relevant materials, and thermophysical material response phenomena related to the plasma–material interactions. The review articles provide comprehensive critical analyses and sets of recommended data for a broader class of interaction processes or thermophysical response phenomena. The series represents a medium for direct exchange of expert assessed or generated atomic and plasma–material interaction data information between the atomic/material physics and fusion research communities.

ATOMIC AND PLASMA–MATERIAL INTERACTION DATA FOR FUSION, Volume 1
(Supplement to the journal Nuclear Fusion)

This first volume is devoted to the plasma–material interaction processes and contains critical data assessments and data collections for all major particle–surface collision processes related to the partial recycling, impurity generation and material erosion in tokamak fusion devices. Apart from processes induced by particle impact, plasma–material interaction effects related to off-normal plasma events (e.g. disruptions, runaway electron bombardment) are also covered in this volume. A summary of the status of data information on these effects is also provided.

STI/PUB/023/APID/01 (138 pp., 87 figures, 21 x 30 cm; 1991)
Price: €21.80

ATOMIC AND PLASMA–MATERIAL INTERACTION DATA FOR FUSION, Volume 2
(Supplement to the journal Nuclear Fusion)

Volume 2 of Atomic and Plasma–Material Interaction Data for Fusion is devoted to the atomic and molecular processes taking place in the edge region of magnetically confined fusion plasmas. The comprehensive review articles included in this volume discuss
exhaustively the current status of the spectroscopic and collision
data for fusion plasma edge constituents. The collision processes
considered include: electron scattering on plasma edge neutrals,
electron impact excitation and ionization of atomic and molecular
ions, particle impact induced dissociative and energy transfer reac-
tions involving molecular hydrogen isotopes, heavy particle colli-
sion processes and ion–molecule reactions. Radiative losses and
electron cooling rates for carbon and oxygen plasma impurities are
also provided.

STI/PUB/023/APID/02 (134 pp., 60 figures, 21 × 30 cm; 1992)
Price: €21.80

**ATOMIC AND PLASMA–MATERIAL INTERACTION**
**DATA FOR FUSION, Volume 3**
**(Supplement to the journal Nuclear Fusion)**

Volume 3 of Atomic and Plasma–Material Interaction Data for
Fusion is devoted to atomic collision processes of helium atoms
and of beryllium and boron atoms and ions in fusion plasmas. Most
of the articles included in this volume are extended versions of the
contributions presented at the IAEA experts meetings on Atomic
Data for Helium Beam Fusion Alpha Particle Diagnostics and on
the Atomic Database for Beryllium and Boron, held in Vienna,
June 1991, or have resulted from the cross-section data analyses
and evaluations performed by the working groups of these meet-
ings. The volume contains reviews of the most important classes of
collision processes of plasma particles with helium atoms and
beryllium and boron ions, and comprehensive sets of recom-
mended cross-section data for these processes.

STI/PUB/023/APID/03 (127 pp., 26 figures, 21 × 30 cm; 1992)
Price: €21.80

**ATOMIC AND PLASMA–MATERIAL INTERACTION**
**DATA FOR FUSION, Volume 4**
**(Supplement to the journal Nuclear Fusion)**

Volume 4 of Atomic and Plasma–Material Interaction Data for
Fusion contains the result of a critical data evaluation of the cross-
sections of ground state and excited hydrogen atoms colliding with
the basic fusion plasma constituents, the electrons and protons, and
with the multiply charged ions of major plasma impurities. The
primary purpose of the present volume is to provide a complete set
of the collisional data required for the modelling of neutral hydro-
gen beam penetration in a thermonuclear fusion plasma.

STI/PUB/023/APID/04 (180 pp., 77 figures, 21 × 30 cm; 1993)
Price: €25.44
Volume 5 of Atomic and Plasma–Material Interaction Data for Fusion is devoted to a critical review of the physical and thermomechanical properties of presently considered candidate plasma-facing and structural materials for next-generation thermonuclear fusion reactors. This volume should provide fusion reactor designers with a source of critically assessed material properties data, including information on the material response to high heat and particle fluxes and on the thermohydrodynamic coupling with coolants. Emphasis is given to the presentation of the most recent results for plasma-facing reactor materials.

Volume 6 of Atomic and Plasma–Material Interaction Data for Fusion includes critical reviews and results of original experimental and theoretical studies on inelastic collision processes among the basic and dominant impurity constituents of fusion plasmas. The following processes are considered: electron impact excitation of excited helium atoms, electron impact excitation and ionization of plasma impurity ions and atoms, electron–impurity–ion recombination and excitation, ionization and electron capture in collisions of plasma protons and impurity ions with the main fusion plasma neutron components H, He and H2 (the latter being always present in the plasma edge or introduced into the plasma by neutral beam injection for heating, fuelling or diagnostic purposes).

Volume 7, Part A of Atomic and Plasma–Material Interaction Data for Fusion is devoted to a critical review of the chemical erosion behaviour of fusion plasma-facing materials, in particular carbon, beryllium and tungsten. It is intended to provide fusion reactor designers with a detailed survey and parametrization of existing, critically assessed data for the chemical erosion of plasma-facing materials by particle impact. This volume together with Part B is the result of a five year Co-ordinated Research Programme on

Contents: 1. Introduction; 2. Erosion data derived from tokamaks; 3. Carbon-based materials: Selected collection of chemical erosion data; 4. Comprehensive set of chemical erosion data from various laboratories; Appendix A: List of abbreviations; Appendix B: List of analytical fitting functions.

STI/PUB/023/APID/07/A (277 pp., 35 figures, 21 × 30 cm; 1998)
Price: €29.07

ATOMIC AND PLASMA–MATERIAL INTERACTION DATA FOR FUSION, Volume 7, Part B

Volume 7, Part B of Atomic and Plasma–Material Interaction Data for Fusion is devoted to a critical review of the erosion behaviour of fusion plasma-facing materials due to physical sputtering and radiation-enhanced sublimation, in particular for carbon, beryllium and tungsten. It is intended to provide fusion reactor designers with a detailed survey and parametrization of existing, critically assessed data for the physical sputtering and radiation-enhanced sublimation of plasma-facing materials by particle impact. This volume together with Part A is the result of a five year Co-ordinated Research Project on Plasma-Interaction Induced Erosion of Fusion Reactor Materials in the period 1992–1997.

Contents: 1. Introduction; 2. Physical sputtering of elemental targets and compounds; 3. Radiation-enhanced sublimation: Data collection; Appendix A: List of abbreviations; Appendix B: List of analytical fitting functions.

STI/PUB/023/APID/07/B (188 pp., 149 figures, 21 × 30 cm; 2001)
Price: €25.44

ATOMIC AND PLASMA–MATERIAL INTERACTION DATA FOR FUSION, Volume 8

Volume 8 provides an exhaustive source of information on elastic scattering, momentum transfer and viscosity cross-sections for collisions of hydrogenic ions, atoms and molecules, and their isotopes, in the energy range pertinent to fusion reactor divertor plasma and extending (in its low-energy part) to collision conditions that are relevant for astrophysics. Hydrogen ion–helium atom collisions are also included in this volume. The reported cross-sections are obtained from extensive quantum-mechanical calculations and can be regarded as having very high accuracy.

STI/PUB/023/APID/08 (699 pp., 37 figures, 21 × 30 cm; 1998)
Price: €58.14

**ATOMIC AND PLASMA–MATERIAL INTERACTION DATA FOR FUSION, Volume 9**

Volume 9 of Atomic and Plasma–Material Interaction Data for Fusion is devoted to a review of the role of atomic, molecular and plasma–wall interaction processes in divertor plasmas of magnetic fusion devices. The present volume is intended to provide fusion reactor designers with a detailed survey of existing, critically assessed data for the behaviour of plasma-facing materials under particle impact. This volume of Atomic and Plasma–Material Interaction Data for Fusion is the result of a three year Co-ordinated Research Project on "Atomic and plasma-wall interaction data for fusion reactor divertor modelling" in the period 1998–2000.

Contents: Seventeen review and original research articles on atomic and plasma–wall interaction topics in divertor plasma modelling.

STI/PUB/023/APID/09 (316 pp., 182 figures, 21 × 30 cm; 2001)
Price: €29.07

**FORTHCOMING**

**ATOMIC AND PLASMA-MATERIAL INTERACTION DATA FOR FUSION, Volume 10**

Volume 10 of Atomic and Plasma-Material Interaction Data for Fusion is devoted to a review of cross section data for charge exchange processes relevant to magnetically confined fusion devices. The present volume is intended to provide modellers of fusion devices an updated set of cross sections, determined from both experiment and theory, for a variety of charge exchange processes, including state selective cross sections. Reactants include both atoms and molecules relevant to fusion energy research, including hydrogen atoms and molecules, helium, carbon, oxygen and hydrocarbon molecules. This volume of Atomic and Plasma-Material Interaction Data for Fusion is the result of a three year Co-ordinated Research Project on "Charge Exchange Cross Sections Data for Fusion Plasma Studies" in the period 1998-2000.

Contents: 12 review and original research articles on charge exchange cross sections for reactants typical of those found in fusion plasma machines.
NUCLEAR GEOPHYSICS AND ITS APPLICATIONS
Technical Reports Series No. 393

This report aims at providing background information and a comprehensive account of the nature of nuclear geophysics, its fundamentals, its objectives, its tools for investigation and its wide range of applications benefiting society and industry. It reviews the achievements and performance of nuclear geophysical measurements, particularly in applications to mining, industry and agriculture. It also analyses many of these important applications for their economic impact and updates the available information on nuclear geophysics by giving an account of the most relevant achievements and concepts introduced during recent years.


STI/DOC/010/393 (200 pp., 42 figures; 1999)
ISBN 92-0-100699-3
Price: €49.42

ABSORBED DOSE DETERMINATION IN EXTERNAL BEAM RADIOTHERAPY: An International Code of Practice for Dosimetry Based on Standards of Absorbed Dose to Water
Technical Reports Series No. 398

This Code of Practice, which has also been endorsed by WHO, PAHO and ESTRO, fulfils the need for a systematic and internationally unified approach to the calibration of ionization chambers in terms of absorbed dose to water and to the use of these detectors in determining the absorbed dose to water for the radiation beams used in radiotherapy. It provides a methodology for the determination of absorbed dose to water in the low, medium and high energy photon beams, electron beams, proton beams and heavy ion beams used for external radiation therapy.

STI/DOC/010/398 (229 pp., 29 figures; 2001)
ISBN 92-0-102200-X
Price: €50.87


This second edition contains eight additional pages, summarizing recommended changes resulting from a review of data and procedures presented in the first edition. Otherwise, the report remains unchanged. The report itself represents a step towards a universal code advising users in Secondary Standard Dosimetry Laboratories (SSDLs) and radiation therapy centres throughout the world on how to obtain the absorbed dose from a measurement of exposure or another appropriate quantity. As the numerical result of a physical measurement must be complemented by an assessment of its uncertainty, Appendix A to this Code gives a brief summary of a treatment uncertainties concept by A. Allisy and J.W. Müller from the Bureau International des Poids et Mesures (BIPM).


STI/DOC/010/277/2 (98 pp., 16 figures; 1997)
E ISBN 92-0-100597-0
S ISBN 92-0-304198-2
Price: €26.16
This manual is a revision of Technical Reports Series No. 260, Biological Dosimetry: Chromosomal Aberration Analysis for Dose Assessment (1986). It provides the latest information on standardized conventional methods used for the cytogenetic assessment of doses incurred through ionizing radiation (scoring dicentric chromosomes) and on newly available proven techniques such as fluorescence in situ hybridization (FISH), premature chromosomal condensation and micronucleus assays.


STI/DOC/010/405 (127 pp., 16 figures; 2001)
ISBN 92-0-102101-1
Price: €31.98

HIGH DOSE DOSIMETRY FOR RADIATION PROCESSING
Proceedings Series

Proceedings of a symposium, the second in its field, Vienna, 5–9 November 1990. Reliable dosimetry is a key parameter for quality assurance of radiation processing and irradiated products. The standardization of dosimetry provides a basis for the regulatory approval of irradiated products and for international clearance for free trade. Papers presented at the meeting discussed the development of new techniques, the improvement of reference and routine dosimetry systems and the quality control and assurance of dosimetry, giving an authoritative account of the status of high dose dosimetry throughout the world in 1990.

Contents: General aspects; Development of dosimetry techniques; Reference dosimetry and review of dosimetry techniques; Quality control and assurance of dosimetry.

STI/PUB/846 (513 pp., 217 figures; 1991)
ISBN 92–0–010291–3
Price: €100.29
MEASUREMENT ASSURANCE IN DOSIMETRY
Proceedings Series

Proceedings of a symposium, Vienna, 24–27 May 1993. Accurate dosimetry is of great importance for applications of radiation in medicine. The symposium covered all the various steps required in the calibration chain to determine the absorbed dose in radiotherapy. Different calibration procedures at primary and secondary standard laboratories were discussed, and reports were presented on dose intercomparisons based on different national and international protocols. Analyses of accuracy of various interaction coefficients were also presented. The final session dealt with the special problems of diagnostic X ray dosimetry.

Contents: Status of primary standards for absorbed dose, exposure and kerma; Intercomparison, dissemination and transfer; Calibrations and quality assurance programmes; Dose, volume and quality specifications; Interaction coefficients and correction factors; Application of different protocols for absorbed dose determination; Plane parallel chambers; Beam quality dependence; Direct calibration in absorbed dose to water; Diagnostic X ray dosimetry.

STI/PUB/930 (691 pp., 167 figures; 1994)
ISBN 92-0-100194-0
Price: €138.08

APPLICATIONS OF ISOTOPES AND RADIATION IN CONSERVATION OF THE ENVIRONMENT
Proceedings Series

Proceedings of a symposium, Karlsruhe, 9–13 March 1992. The objective was to review present knowledge of the applications of radiation, radioisotopes and nuclear methods of analysis in the monitoring and control of environmental pollution and in reducing emissions of environmentally toxic substances. Isotopes and radiation have many characteristics which enable them to make unique contributions to the better understanding of environmental processes, as well as to directly protect the environment from the impact of toxic substances. These kinds of application form the focus of this volume.

Contents: Overviews of some main areas of application of nuclear techniques; Flue gas purification; Radiation processing of liquid and solid wastes; Industrial applications; Radiotracer studies; Major analytical techniques and new approaches in environmental monitoring and research; Nuclear analytical techniques and their
GUIDEBOOK ON RADIOISOTOPE TRACERS IN INDUSTRY
Technical Reports Series No. 316

The idea of using tracers (chemical tracers, dyes, etc.) in the investigation of complex physical phenomena has always attracted the attention of scientists and engineers. When radioactive isotopes became available it was immediately recognized that they offered an almost ideal solution to tracer selection. Extensive experience has been gathered all over the world in the application of radioactive tracers in industry. This guide is devoted to reviewing the present status of the tracer method as such and to its applications to those branches of industry which have derived large benefits from the use of this technology.

Contents: Chapter 1. Introduction; Chapter 2. The concept of tracers; Chapter 3. General tracer technology; Chapter 4. Tracer methodology; Chapter 5. General applications; Chapter 6. Case studies; Chapter 7. Current trends in development and applications; Annexes I–VI.

HARMONIZATION OF HEALTH RELATED ENVIRONMENTAL MEASUREMENTS USING NUCLEAR AND ISOTOPIC TECHNIQUES
Proceedings Series

Proceedings of a symposium held in Hyderabad, India, 4–7 November 1996. The aim of the symposium was to provide an international forum for discussion of the applications of nuclear analytical techniques and related isotopic tracer methods, particularly in the area of analytical quality assurance, including validation of analytical methods and development of new analytical reference materials. As these methodologies contribute substantially to the harmonization of data, they are playing an important role in the application of newly emerging techniques such as quality management and quality assurance standards (e.g. ISO-25 and ISO-9000) in environmental analytical laboratories. The symposium programme covered a wide variety of applications of
nuclear (and related) analytical techniques (mainly neutron activation analysis, energy dispersive X ray fluorescence, particle induced X ray emission and inductively coupled plasma–mass spectrometry) as used in the study of air particulates, solid waste products, sediments, food, water, human tissues, biomonitors and other kinds of environmental samples.

Contents: Quality systems and strategies; Reference materials: Production, certification and use; Nuclear analytical techniques: General aspects and quality assurance/quality control; Nuclear techniques and applications of quality assurance/quality control: Biological systems; Nuclear techniques and applications of quality assurance/quality control: Non-biological systems; Poster presentations.

STI/PUB/1006 (663 pp., 128 figures; 1997)
ISBN 92–0–103697–3
Price: €142.44

NUCLEAR TECHNIQUES IN THE EXPLORATION AND EXPLOITATION OF ENERGY AND MINERAL RESOURCES
Proceedings Series

Proceedings of a symposium, Vienna, 5–8 June 1990. Over the past decades, many nuclear techniques have been developed and used on an industrial scale for the exploration and exploitation of energy and mineral resources, resulting in very great technical and economic benefits. The major nuclear techniques which are currently employed on a large scale include nucleonics control and on-stream analysis, nuclear well logging and tracer investigations. The advantages of nuclear techniques include rapidity, relative simplicity and, in some cases, the possibility of use in hostile environments where no other methods can be used. Furthermore, nuclear measurements and nucleonics control can be made by non-contact processes. The purpose of the symposium was to review the latest concepts and developments and to foster an exchange of information leading to technology transfer from developed to developing countries.

Contents: Nucleonics control systems and on-stream analysers in the coal industry; On-line nuclear and nuclear related analytical techniques in the mineral industry; Nucleonics control systems and on-stream mineral analysers; Nuclear borehole logging applications; Nuclear borehole logging instrumentation, data processing and interpretation; Tracer techniques and radiometric methods in the mineral industry; Off-line nuclear activation analysis in the mineral industry; Summary of the panel discussion: Nuclear and nuclear related techniques in the mineral industry — trends and future perspectives.

STI/PUB/841 (627 pp., 207 figures; 1991)
APPLICATIONS OF ISOTOPES AND RADIATION IN CONSERVATION OF THE ENVIRONMENT

(See under Nuclear Analytical Techniques, p. 14)

CODE ON THE SAFETY OF NUCLEAR RESEARCH REACTORS: DESIGN
Safety Series No. 35-S1

This publication presents international consensus principles useful in the design of a research reactor. It is complemented by Safety Series No. 35-S2, Code on the Safety of Nuclear Research Reactors: Operation. Both publications provide basic principles and requirements for the safety of research reactors and critical assemblies, including the essential safety requirements for siting, quality assurance and regulatory control. These codes supersede the 1984 edition of Safety Series No. 35, Safe Operation of Research Reactors and Critical Assemblies.

Contents: Definitions; 1. Introduction; 2. Safety objectives; 3. Regulatory supervision; 4. Siting requirements; 5. General design requirements; 6. Specific design requirements; Appendix: Selected postulated initiating events; Annex: Selected safety functions.

STI/PUB/927 (44 pp., 1992)
E ISBN 92-0-104292-2
F ISBN 92-0-200193-2
R ISBN 92-0-400592-0
S ISBN 92-0-300292-8
Price: €15.99

CODE ON THE SAFETY OF NUCLEAR RESEARCH REACTORS: OPERATION
Safety Series No. 35-S2

This publication presents international consensus principles useful in the operation of a research reactor. It is complemented by Safety Series No. 35-S1, Code on the Safety of Nuclear Research Reactors: Design. Both publications provide basic principles and requirements for the safety of research reactors and critical assem-
bles, including the essential safety requirements for siting, quality assurance and regulatory control. These codes supersede the 1984 edition of Safety Series No. 35, Safe Operation of Research Reactors and Critical Assemblies.


STI/PUB/928 (44 pp.; 1992)
E ISBN 92-0-104392-9
F ISBN 92-0-200293-2
R ISBN 92-0-400692-7
S ISBN 92-0-300392-4
Price: €15.99

DIRECTORY OF NUCLEAR RESEARCH REACTORS 1998

This Directory provides administrative, technical and utilization information on research reactors, operational or shut down, available in the IAEA Research Reactor Data Base (RRDB) as of the end of October 1998. General information on reactors which are planned or are under construction is also included. All information was collected by the IAEA through questionnaires.

Contents: Part I: Operating reactors; Part II: Shut down reactors; Part III: Reactors with unverified information; Part IV: Reactors under construction; Part V: Planned reactors; Part VI: Decommissioned reactors; Part VII: Statistical summary; Part VIII: Abbreviations; Part IX: Sample questionnaire.

STI/PUB/1071 (761 pp., 3 figures, 21 x 30 cm; 1998)
ISBN 92-0-104998-6
Price: €183.14

NUCLEAR RESEARCH REACTORS IN THE WORLD
September 2000 Edition
Reference Data Series No. 3

This is the thirteenth edition of Reference Data Series No. 3. This booklet contains general information, as of the end of August 2000, on research reactors in operation, under construction, planned and
shut down. The information is collected by the Agency through questionnaires sent to Member States through the designated national correspondents.

IAEA-RDS-3/13 (138 pp., 11 figures, 9.5 x 17.5 cm; 2000)
ISBN 92-0-100298-X
Price: €18.17

SAFETY ASSESSMENT OF RESEARCH REACTORS AND PREPARATION OF THE SAFETY ANALYSIS REPORT
Safety Series No. 35-G1

This Safety Guide, a companion document to Safety Series Nos' 35-S1 and 35-S2, is part of a set of publications in the IAEA Safety Series dealing with all the important areas of research reactor safety, which includes Safety Standards, Safety Guides and Safety Practices. It presents guidelines, approved by international consensus, for the preparation, review and assessment of the safety documentation (Safety Series No. 35-S1) and for the preparation of the Safety Analysis Report (SAR) (Safety Series No. 35-S2). In addition, it is most applicable during the design and construction stage of research reactors, as well as during relicensing or reassessment of already existing reactors.

Contents: 1. Introduction; 2. Requirements for safety assessment in the licensing process for a research reactor; 3. Preparation of the safety analysis report; 4. Performance of the review and assessment; Appendix: Contents of a Safety Analysis Report; Annex I: Safety analysis approach and methods; Annex II: Examples of input parameters and initial conditions; Annex III: Examples of items to be considered in the reactor description; Annex IV: Typical sources of radioactive material or radiation fields in a research reactor.

STI/PUB/960 (103 pp.; 1994)
ISBN 92-0-104594-8
Price: €29.07

SAFETY IN THE UTILIZATION AND MODIFICATION OF RESEARCH REACTORS
Safety Series No. 35-G2

This Safety Guide, part of a set of publications in the IAEA Safety Series dealing with all the important areas of research reactor safety which includes Safety Standards, Safety Guides and Safety Practices, develops the general concepts presented in Safety Series Nos 35-S1 and No. 35-S2 and should be read in conjunction with them. It presents guidelines, approved by international consensus,
for the safe utilization and modification of research reactors to ensure that these projects are implemented without undue risks to personnel, the public, the environment or the reactor. While the guide is most applicable to existing reactors, it is also recommended for use by organizations planning to put a new reactor into operation.

**Contents:**
1. Introduction; 2. Organization and responsibilities; 3. Safety assessment, categorization and approval routes; 4. General and specific safety requirements for design; 5. Pre-implementation phase of a utilization or modification project; 6. Implementation phase of a utilization or modification project; 7. Post-implementation phase of a utilization or modification project; 8. Operational safety requirements for experiments; 9. Safety considerations in the handling, dismantling, post-irradiation examination and disposal of experimental devices; 10. Safety aspects of out-of-reactor installations; 11. Quality assurance of experiments and modifications; Annex I: Categorization criteria; Annex II: Justification of a project.

STI/PUB/961 (47 pp., 1 figure; 1994)
ISBN 92-0-104694-4
Price: €17.44

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**Nuclear Data**

*CIAMDA 98 — An Index to the Literature of Atomic and Molecular Collision Data Relevant to Fusion Research*

The CIAMDA Series attempts to provide a worldwide bibliographic index of the research publications on collisions between electrons, photons, hydrogen isotopes and helium, as well as collisions between these species and other ions, atoms and molecules of importance in magnetic confinement fusion research. The bibliographic index in CIAMDA is also useful to researchers working in the broader field of atomic and molecular physics. The first issue, CIAMDA 80, covers the period from the early 1950s to the middle of 1979. The second issue, CIAMDA 87, contains bibliographic references from the cut-off date of CIAMDA 80 to August 1986 and includes extended indexations lines and supplementary reference citations to non-indexed references. The present volume, CIAMDA 98, contains bibliographic references since September 1986 and in addition contains a section with supplemental (non-indexed) data references.

**Contents:**
Introduction; Section I. Data index for collisions between two partners; Section II. Bibliography for the data index; Section III. Supplemental data references; Section IV. Author
An index to literature and computer files on microscopic neutron data. It is a worldwide bibliography of the literature on microscopic neutron nuclear data resulting from experiments, theory and evaluations, and an index to internationally available computer libraries of neutron data. It is thus of interest to every scientist involved in pure or applied neutron physics, such as experimental neutron physics, compilation and evaluation of neutron nuclear data, reactor physics, nuclear fusion, neutron dosimetry, radiation protection and shielding, irradiation in medicine and biology, radioisotope production and neutron activation techniques. The present CINDA file contains more than 230 000 entries. It also includes index lines for experimental and evaluated numerical data files available from data centres. The entries are sorted by element, isotope and data category. The list of data categories comprises microscopic cross-sections, angular distributions and energy spectra from all neutron-induced reactions of the energy range from 0 to 50 MeV and above, as well as resonance parameters, resonance integrals, level density parameters, yields of fission neutrons and fission fragments, gamma ray spectra, and also a few related nuclear reactions such as spontaneous fission, photo-fission and production of photo-neutrons. CINDA-A, the archival issue in 5 volumes, contains entries from the literature published between 1935 and 1987. CINDA-A is supplemented by CINDA 90, which covers the literature published from 1988 to spring 1990.

Contents: Vol. 1: Introduction; CINDA listing for collective entries ‘Many’ and ‘Fprod’; Molecules and mixtures; Annex; Vol. 2: CINDA listing for 1 Hydrogen to 30 Zinc; Vol. 3: CINDA listing for 31 Gallium to 54 Xenon; Vol. 4: CINDA listing for 55 Caesium to 83 Bismuth; Vol. 5: CINDA listing for 84 Polonium to 105 Hahnium.

CINDA 2002 is an index to literature and computer files on microscopic neutron nuclear data published after 1987. It supersedes the previous issue CINDA 2000. The current book includes, for the first time, a CD-ROM entitled CD-CINDA 2002, which contains the complete CINDA file and retrieval options. The complete CINDA files as of 1 June 2002 are contained in the archival issue CINDA-A (1990) plus the current issue CINDA 2002, and in CD-CINDA 2002.

Expected publication date: Autumn 2002

CINDA 2002 (approx. 539 pp., 21 x 30 cm)
ISBN 92–0–112502–X
Price: price not yet set

COMPENDIUM OF NEUTRON SPECTRA AND DETECTOR RESPONSES FOR RADIATION PROTECTION PURPOSES
Technical Reports Series No. 318

A wide variety of radiation dosimeters and survey instruments are used to monitor exposure to neutrons. To establish an adequate neutron monitoring programme and to evaluate dosimetry results properly, it is important to know both the energy distribution of the neutrons encountered and the energy dependent response of the measuring devices. It is also important for calibration to use such neutron fields whose spectra are appropriate for the particular application. This compendium includes a collection of neutron spectra encountered in various occupational environments and the spectra of calibration neutron sources. It also gives the response functions of various neutron dosimeters and survey instruments. Finally, it includes the calculated energy responses for each of the detectors and spectra given.

Contents: Chapter 1. Introduction; Chapter 2. Dosimetric quantities; Chapter 3. Dosimeters and survey instrument response functions; Chapter 4. Calibration neutron spectra; Chapter 5. Operational spectra; Chapter 6. Monoenergetic neutrons incident on elliptical phantom.
The neutron fluence to dose conversion factor, detector responses and spectra tabulated are available on diskette from: Division of Publications, International Atomic Energy Agency, P.O. Box 100, A-1400 Vienna, Austria.

STI/DOC/10/318 (274 pp., 61 figures; 1990)
ISBN 92-0-125290-0
Price: €52.32

**COMPENDIUM OF NEUTRON SPECTRA AND DETECTOR RESPONSES FOR RADIATION PROTECTION PURPOSES — Supplement to Technical Reports Series No. 318**

This supplement is an update of Technical Reports Series No. 318, Compendium of Neutron Spectra and Detector Responses for Radiation Protection Purposes (1990), that takes into account the major changes in the recommended energy dependence of risk related quantities, the increased importance of high neutron energies, the increased use of boron neutron capture therapy, promising new developments in detector design, new measured workplace spectra and improved calibration facilities. It includes the fluence to dose equivalent conversion coefficients for the recently recommended radiation protection quantities and a large number of fluence response functions for recently developed or improved detectors, as well as over 200 new spectra.

**Contents:** Chapter 1. Introduction; Chapter 2. Dosimetric quantities; Chapter 3. Multisphere, survey instrument and dosimeter responses; Chapter 4. Calibration and reference spectra; Chapter 5. Operational spectra; Chapter 6. Use of data from the previous compendium; Appendix: Examples of compendium allocations; References.

STI/DOC/010/403 (337 pp., 82 figures; 2001)
ISBN 92-0-102201-8
Price: €74.13

**HANDBOOK ON NUCLEAR DATA FOR BOREHOLE LOGGING AND MINERAL ANALYSIS**

This handbook is a compendium of nuclear data to be used for neutron borehole logging and neutron activation analysis of mineral samples, meeting the major requirements of the nuclear geophysics community for microscopic cross-section and decay data.
Contents: Chapter 1. Introduction; Chapter 2. Table of nuclides; Chapter 3. Prompt gamma rays from thermal neutron capture — Extracted from the database; Chapter 4. Nuclear decay gamma rays with intensities higher than 5% — An extract from the ENSDF radioactivity database; Chapter 5. Spectra of neutron sources; Chapter 6. Neutron induced reaction cross-section data for nuclides required for borehole logging and mineral analysis; Chapter 7. Neutron source averaged cross sections.

STI/DOC/10/357 (231 pp. + 1 diskette containing approx. 100 pp., 78 figures; 1993)
ISBN 92–0–102393–6
Price: €72.67
This report assesses the market potential and economics of the use of nuclear energy in various non-electric applications, including district heating, the supply of process heat, water desalination, ship propulsion and outer space applications. It also gives an overview of promising innovative applications, such as fuel synthesis (including hydrogen production) and oil extraction.


Expected publication date: Autumn 2002

STI/DOC/010/410 (approx. 242 pp., 29 figures)
ISBN 92-0-115402-X
Price: not yet set
**Applications of Isotopes and Radiation in Conservation of the Environment**

Proceedings Series

Proceedings of a symposium, Karlsruhe, 9–13 March 1992. The objective was to review present knowledge of the applications of radiation, radioisotopes and nuclear methods of analysis in the monitoring and control of environmental pollution and in reducing emissions of environmentally toxic substances. Isotopes and radiation have many characteristics which uniquely contribute to the better understanding of environmental processes, as well as directly protect the environment from the impact of toxic substances. These kinds of applications form the focus of this volume.

**Contents**: Overviews of some main areas of application of nuclear techniques; Flue gas purification; Radiation processing of liquid and solid wastes; Industrial applications; Radiotracer studies; Major analytical techniques and new approaches in environmental monitoring and research; Nuclear analytical techniques and their applications: 1. Atmospheric studies; 2. Studies of solid wastes, sediments and soils; 3. Hydrochemical and miscellaneous studies; Panel: Current problems and future trends in the use of isotopes and radiation for conservation of the environment.

STI/PUB/904 (699 pp., 221 figures; 1992)
ISBN 92-0-000492-X
Price: €138.08

**High Dose Dosimetry for Radiation Processing**

Proceedings Series

Proceedings of a symposium, the second in its field, Vienna, 5–9 November 1990. Reliable dosimetry is a key parameter for quality assurance of radiation processing and irradiated products. The standardization of dosimetry provides a basis for the regulatory approval of irradiated products and for international clearance for free trade. Papers presented at the meeting discussed the development of new techniques, the improvement of reference and routine dosimetry, systems and the quality control and assurance of dosimetry, presenting an authoritative account of the status of high dose dosimetry throughout the world in 1990.

**Contents**: General aspects; Development of dosimetry techniques; Reference dosimetry and review of dosimetry techniques; Quality control and assurance of dosimetry.

STI/PUB/846 (513 pp., 217 figures; 1991)
GUIDEBOOK ON RADIOISOTOPE TRACERS IN INDUSTRY
Technical Reports Series No. 316

The idea of using tracers (chemical tracers, dyes, etc.) in the investigation of complex physical phenomena has always attracted the attention of scientists and engineers. When radioactive isotopes became available it was immediately recognized that they offered an almost ideal solution to tracer selection. Extensive experience has been gathered all over the world in the application of radioactive tracers in industry. This guide is devoted to reviewing the present status of the tracer method as such and to its applications to those branches of industry which have derived large benefits from the use of this technology.

Contents: Chapter 1. Introduction; Chapter 2. The concept of tracers; Chapter 3. General tracer technology; Chapter 4. Tracer methodology; Chapter 5. General applications; Chapter 6. Case studies; Chapter 7. Current trends in development and applications; Annexes I-VI.

STI/DOC/10/316 (374 pp., 116 figures; 1990)
ISBN 92-0-165090-6
Price: €77.03

HARMONIZATION OF HEALTH RELATED ENVIRONMENTAL MEASUREMENTS USING NUCLEAR AND ISOTOPIC TECHNIQUES
Proceedings Series

Proceedings of a symposium held in Hyderabad, India, 4-7 November 1996. The aim of the symposium was to provide an international forum for discussion of the applications of nuclear analytical techniques and related isotopic tracer methods, particularly in the area of analytical quality assurance, including validation of analytical methods and development of new analytical reference materials. As these methodologies contribute substantially to the harmonization of data, they are playing an important role in the application of newly emerging techniques such as quality management and quality assurance standards (e.g. ISO-25 and ISO-9000) in environmental analytical laboratories. The symposium programme covered a wide variety of applications of nuclear (and related) analytical techniques (mainly neutron activa-
tion analysis, energy dispersive X ray fluorescence, particle induced X ray emission and inductively coupled plasma-mass spectrometry) as used in the study of air particulates, solid waste products, sediments, food, water, human tissues, biomonitors and other kinds of environmental samples.

Contents: Quality systems and strategies; Reference materials: Production, certification and use; Nuclear analytical techniques: General aspects and quality assurance/quality control; Nuclear techniques and applications of quality assurance/quality control: Biological systems; Nuclear techniques and applications of quality assurance/quality control: Non-biological systems; Poster presentations.

STI/PUB/1006 (663 pp., 128 figures; 1997)
ISBN 92-0-103697-3
Price: €142.44

NUCLEAR TECHNIQUES IN THE EXPLORATION AND EXPLOITATION OF ENERGY AND MINERAL RESOURCES
Proceedings Series

Proceedings of a symposium, Vienna, 5-8 June 1990. Over the past decades, many nuclear techniques have been developed and used on an industrial scale for the exploration and exploitation of energy and mineral resources, resulting in very great technical and economic benefits. The major nuclear techniques which are currently employed on a large scale include nucleonics control and on-stream analysis, nuclear well logging and tracer investigations. The advantages of nuclear techniques include rapidity, relative simplicity and, in some cases, the possibility of use in hostile environments where no other methods can be used. Furthermore, nuclear measurements and nucleonics control can be made by non-contact processes. The purpose of the symposium was to review the latest concepts and developments and to foster an exchange of information leading to technology transfer from developed to developing countries.

Contents: Nucleonics control systems and on-stream analysers in the coal industry; On-line nuclear and nuclear related analytical techniques in the mineral industry; Nucleonics control systems and on-stream mineral analysers; Nuclear borehole logging applications; Nuclear borehole logging instrumentation, data processing and interpretation; Tracer techniques and radiometric methods in the mineral industry; Off-line nuclear activation analysis in the mineral industry; Summary of the panel discussion: Nuclear and nuclear related techniques in the mineral industry — trends and future perspectives.

STI/PUB/841 (627 pp., 207 figures; 1991)
ISBN 92-0-060091-3
Price: €120.64
PLASMA PHYSICS AND
NUCLEAR FUSION

ATOMIC AND PLASMA–MATERIAL
INTERACTION DATA FOR FUSION

The purpose of this series of annually published volumes of which the earlier issues were supplements to the Nuclear Fusion journal is to make available original contributions and review articles containing high quality data on the atomic and plasma–material interaction processes of interest to thermonuclear fusion research. The scientific scope of the series includes the topics of elementary atomic collision processes in fusion plasmas, involving photons, electrons, ions, atoms and molecules, the collision processes of plasma particles with surfaces of fusion relevant materials, and thermophysical material response phenomena related to the plasma–material interactions. The review articles provide comprehensive critical analyses and sets of recommended data for a broader class of interaction processes or thermophysical response phenomena. The series represents a medium for direct exchange of expert assessed or generated atomic and plasma–material interaction data information between the atomic/material physics and fusion research communities.

ATOMIC AND PLASMA–MATERIAL INTERACTION DATA FOR FUSION, Volume 1
(Supplement to the journal Nuclear Fusion)

This first volume is devoted to the plasma–material interaction processes and contains critical data assessments and data collections for all major particle–surface collision processes related to the partial recycling, impurity generation and material erosion in tokamak fusion devices. Apart from processes induced by particle impact, plasma–material interaction effects related to off-normal plasma events (e.g. disruptions, runaway electron bombardment) are also covered in this volume. A summary of the status of data information on these effects is also provided.

STI/PUB/023/APID/01 (138 pp., 87 figures, 21 × 30 cm; 1991)
Price: €21.80
Volume 2 of Atomic and Plasma-Material Interaction Data for Fusion is devoted to the atomic and molecular processes taking place in the edge region of magnetically confined fusion plasmas. The comprehensive review articles included in this volume discuss exhaustively the current status of the spectroscopic and collision data for fusion plasma edge constituents. The collision processes considered include: electron scattering on plasma edge neutrals, electron impact excitation and ionization of atomic and molecular ions, particle impact induced dissociative and energy transfer reactions involving molecular hydrogen isotopes, heavy particle collision processes and ion–molecule reactions. Radiative losses and electron cooling rates for carbon and oxygen plasma impurities are also provided.

STI/PUB/023/APID/02 (134 pp., 60 figures, 21 × 30 cm; 1992)
Price: €21.80

Volume 3 of Atomic and Plasma-Material Interaction Data for Fusion is devoted to atomic collision processes of helium atoms and of beryllium and boron atoms and ions in fusion plasmas. Most of the articles included in this volume are extended versions of the contributions presented at the IAEA experts meetings on Atomic Data for Helium Beam Fusion Alpha Particle Diagnostics and on the Atomic Database for Beryllium and Boron, held in Vienna, June 1991, or have resulted from the cross-section data analyses and evaluations performed by the working groups of these meetings. The volume contains reviews of the most important classes of collision processes of plasma particles with helium atoms and beryllium and boron ions, and comprehensive sets of recommended cross-section data for these processes.

STI/PUB/023/APID/03 (127 pp., 26 figures, 21 × 30 cm; 1992)
Price: €21.80

Volume 4 of Atomic and Plasma-Material Interaction Data for Fusion contains the result of a critical data evaluation of the cross-sections of ground state and excited hydrogen atoms colliding with the basic fusion plasma constituents, the electrons and protons, and
with the multiply charged ions of major plasma impurities. The primary purpose of the present volume is to provide a complete set of the collisional data required for the modelling of neutral hydrogen beam penetration in a thermonuclear fusion plasma.

STI/PUB/023/APID/04 (180 pp., 77 figures, 21 x 30 cm; 1993)
Price: €25.44

**ATOMIC AND PLASMA–MATERIAL INTERACTION DATA FOR FUSION, Volume 5 (Supplement to the journal Nuclear Fusion)**

Volume 5 of Atomic and Plasma–Material Interaction Data for Fusion is devoted to a critical review of the physical and thermo-mechanical properties of presently considered candidate plasma-facing and structural materials for next-generation thermonuclear fusion reactors. This volume should provide fusion reactor designers with a source of critically assessed material properties data, including information on the material response to high heat and particle fluxes and on the thermohydrodynamic coupling with coolants. Emphasis is given to the presentation of the most recent results for plasma-facing reactor materials.

STI/PUB/023/APID/05 (268 pp., 197 figures, 21 x 30 cm; 1994)
Price: €25.44

**ATOMIC AND PLASMA–MATERIAL INTERACTION DATA FOR FUSION, Volume 6 (Supplement to the journal Nuclear Fusion)**

Volume 6 of Atomic and Plasma–Material Interaction Data for Fusion includes critical reviews and results of original experimental and theoretical studies on inelastic collision processes among the basic and dominant impurity constituents of fusion plasmas. The following processes are considered: electron impact excitation of excited helium atoms, electron impact excitation and ionization of plasma impurity ions and atoms, electron–impurity–ion recombination and excitation, ionization and electron capture in collisions of plasma protons and impurity ions with the main fusion plasma neutron components H, He and H2 (the latter being always present in the plasma edge or introduced into the plasma by neutral beam injection for heating, fuelling or diagnostic purposes).

STI/PUB/023/APID/06 (264 pp., 132 figures, 21 x 30 cm; 1995)
Price: €25.44
Volume 7, Part A of Atomic and Plasma-Material Interaction Data for Fusion is devoted to a critical review of the chemical erosion behaviour of fusion plasma-facing materials, in particular carbon, beryllium and tungsten. It is intended to provide fusion reactor designers with a detailed survey and parametrization of existing, critically assessed data for the chemical erosion of plasma-facing materials by particle impact. This volume together with Part B is the result of a five year Co-ordinated Research Programme on Plasma-Interaction Induced Erosion of Fusion Reactor Materials in the period 1992–1997.

Contents: 1. Introduction; 2. Erosion data derived from tokamaks; 3. Carbon-based materials: Selected collection of chemical erosion data; 4. Comprehensive set of chemical erosion data from various laboratories; Appendix A: List of abbreviations; Appendix B: List of analytical fitting functions.

Volume 7, Part B of Atomic and Plasma-Material Interaction Data for Fusion is devoted to a critical review of the erosion behaviour of fusion plasma-facing materials due to physical sputtering and radiation-enhanced sublimation, in particular for carbon, beryllium and tungsten. It is intended to provide fusion reactor designers with a detailed survey and parametrization of existing, critically assessed data for the physical sputtering and radiation-enhanced sublimation of plasma-facing materials by particle impact. This volume together with Part A is the result of a five year Co-ordinated Research Project on Plasma-Interaction Induced Erosion of Fusion Reactor Materials in the period 1992–1997.

Contents: 1. Introduction; 2. Physical sputtering of elemental targets and compounds; 3. Radiation-enhanced sublimation: Data collection; Appendix A: List of abbreviations; Appendix B: List of analytical fitting functions.
**ATOMIC AND PLASMA–MATERIAL INTERACTION DATA FOR FUSION, Volume 8**

Volume 8 provides an exhaustive source of information on elastic scattering, momentum transfer and viscosity cross-sections for collisions of hydrogenic ions, atoms and molecules, and their isotopes, in the energy range pertinent to fusion reactor divertor plasma and extending (in its low-energy part) to collision conditions that are relevant for astrophysics. Hydrogen ion–helium atom collisions are also included in this volume. The reported cross-sections are obtained from extensive quantum-mechanical calculations and can be regarded as having very high accuracy.

**Contents:** Part A: Introduction and theory; Part B: Ion–neutral collision systems; Part C: Neutral–neutral collision systems.

STI/PUB/023/APID/08 (699 pp., 37 figures, 21 x 30 cm; 1998)
Price: €38.14

**ATOMIC AND PLASMA–MATERIAL INTERACTION DATA FOR FUSION, Volume 9**

Volume 9 of Atomic and Plasma–Material Interaction Data for Fusion is devoted to a review of the role of atomic, molecular and plasma–wall interaction processes in divertor plasmas of magnetic fusion devices. The present volume is intended to provide fusion reactor designers with a detailed survey of existing, critically assessed data for the behaviour of plasma-facing materials under particle impact. This volume of Atomic and Plasma–Material Interaction Data for Fusion is the result of a three year Co-ordinated Research Project on "Atomic and plasma-wall interaction data for fusion reactor divertor modelling" in the period 1998–2000.

**Contents:** Seventeen review and original research articles on atomic and plasma–wall interaction topics in divertor plasma modelling.

STI/PUB/023/APID/09 (316 pp., 182 figures, 21 x 30 cm; 2001)
Price: €29.07

**FORTHCOMING**

**ATOMIC AND PLASMA–MATERIAL INTERACTION DATA FOR FUSION, Volume 10**

Volume 10 of Atomic and Plasma-Material Interaction Data for Fusion is devoted to a review of cross section data for charge exchange processes relevant to magnetically confined fusion devices. The present volume is intended to provide modellers of fusion devices an updated set of cross sections, determined from
both experiment and theory, for a variety of charge exchange processes, including state selective cross sections. Reactants include both atoms and molecules relevant to fusion energy research, including hydrogen atoms and molecules, helium, carbon, oxygen and hydrocarbon molecules. This volume of Atomic and Plasma-Material Interaction Data for Fusion is the result of a three year Co-ordinated Research Project on "Charge Exchange Cross Sections Data for Fusion Plasma Studies" in the period 1998-2000.

Contents: 12 review and original research articles on charge exchange cross sections for reactants typical of those found in fusion plasma machines.

Expected publication date: Autumn 2002

STI/PUB/023/APID/10 (approx. 206 pp., 146 figures)
Price: not yet set

ENERGY FROM INERTIAL FUSION

This publication describes the current scientific, engineering and technological developments in the field of inertial confinement fusion (ICF). It provides an introduction to ICF as well as an overview of the various technologies needed for inertial fusion power plant development. It was compiled by an international group of experts under the auspices of an IAEA Advisory Group on Inertial Fusion Energy and is intended for a large audience, e.g. policy makers, scientists, engineers or technologists in other fields, and students.

Contents: 1. Introduction: Inertial fusion energy fundamentals; 2. Inertial confinement target physics; 3. IFE power plant design principles; 4. Special design issues; 5. Inertial fusion energy development strategy; 6. Safety and environmental impact; 7. Economics and other figures of merit; 8. Other uses of inertial fusion; 9. International activities; Authors.

STI/PUB/944 (457 pp., 146 figures; 1995)
ISBN 92-0-100794-9
Price: €95.93

FUSION ENERGY 1996
Proceedings Series

Proceedings of the Sixteenth International Conference, formerly called the International Conference on Plasma Physics and Controlled Nuclear Fusion Research, Montreal, 7-11 October
The papers presented reflect the excellent progress achieved since the last conference in Seville. Among many other achievements, the Tokamak Fusion Test Reactor has produced over 10 MW of fusion power; the JT-60U experiment has demonstrated plasma conditions equivalent to breakeven; the reversed shear mode has been demonstrated; low aspect ratio tokamaks have produced promising results and plans have been drawn up for powerful new inertial confinement fusion experiments.

Contents: (Vol. 1) Overviews 1; Overviews 2; Concept optimization 1; Confinement and particles; Operational limits and disruptions; Divertor experiments; Concept optimization 2; Transport experiments; Confinement and waves, disruptions and instabilities; Divertor experiments and tokamak concept optimization; (Vol. 2) Helical systems; Alternative systems experiments; Helical systems and alternative systems; Transport theory; MHD and energetic particle theory; Divertor edge physics and alternatives; Theory; ITER (Sessions F and FP); (Vol. 3) Inertial confinement 1; Inertial confinement 2; Inertial confinement (Poster Session); Heating and current drive; Heating and current drive; Reactor studies; Technology and new devices; Technology, new devices and reactor studies (Poster Session).

NUCLEAR FUSION — Special Issue, December 2001
ISSUES ARISING FROM PLASMA-WALL INTERACTIONS IN REACTOR CLASS TOKAMAKS

This special issue of the Nuclear Fusion journal contains two significant review papers. The first paper, "The scientific success of JET (Joint European Torus)" by M. Keilhacker et al., highlights JET's achievements in physics and technology. The second paper, "Plasma-material interactions in current tokamaks and their implications for next step fusion reactors" by G. Federici et al., treats the physical processes and experimental databases of plasma-material interactions in tokamaks and simulation facilities, with emphasis on the relevance to future advances. Technical issues and recommendations for future R&D are also presented in the paper.

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NUCLEAR FUSION — YOKOHAMA SPECIAL ISSUES

These three special issues of the Nuclear Fusion journal contain articles based on some of the papers presented at the 17th Fusion Energy Conference organized by the IAEA and held in Yokohama, Japan, 19–24 October 1998. The articles have been fully refereed. Issue 1 contains overview papers, while issues 2 and 3 present articles on magnetic confinement experiments, plasma heating and current drive, ITER EDA, inertial fusion energy, innovative concepts, fusion technology and theory.

STI/PUB/023/39/Y1 — Issue 1 (144 pp./figures, 21 x 30 cm; 1999)
STI/PUB/023/39/Y2 — Issue 2 (518 pp./figures, 21 x 30 cm; 1999)
STI/PUB/023/40/Y3 — Issue 3 (324 pp./figures, 21 x 30 cm; 2000)
ISSN 0092–5515
Price: Issue 1, 2, 3: €69.77 each
   Special price for all three issues:
   €159.88

PLASMA PHYSICS AND CONTROLLED
NUCLEAR FUSION RESEARCH 1990
Proceedings Series

The proceedings of the Thirteenth International conference, Washington, DC, 29 September to 3 October 1990. The Conference was characterized by reports of steady technical progress in research on both magnetic and inertial confinement fusion, leading towards the long term goal of producing commercial energy from controlled fusion power generators. Also, major results were reported from the completion of the Conceptual Design Activities of the International Thermonuclear Experimental Reactor (ITER) project, which has been conducted since 1988 under the auspices of the IAEA. At the technical sessions more than 200 papers were presented. Contributions were made on: tokamak experiments; inertial confinement; non-tokamak confinement systems; magnetic confinement theory and modelling; plasma heating and current drive; ITER; technology and reactor concepts; and the economic, safety and environmental aspects of fusion.

Contents: (Vol. 1) Artsimovich memorial lecture and tokamak experiments; Plasma heating and current drive. (Vol. 2) Magnetic confinement theory and modelling; Non-tokamak confinement systems; (Vol. 3) Inertial confinement fusion; International thermonuclear experimental reactor (ITER); Technology and reactor concepts; Economic, safety and environmental aspects of fusion; Summaries.

1: ISBN 92–0–130091–3
Proceedings of the Fourteenth International Conference, Würzburg, 30 September to 7 October 1992. The conference was characterized by reports of recent results from all the major fusion facilities around the world, including the milestone experiment at JET in which tritium was introduced for the first time into a tokamak fuel mixture. The proceedings include all the technical papers, the pertinent discussions and five conference summaries.

Contents: (Vol. 1) Artsimovich memorial lecture and tokamak experiments (Session A). (Vol. 2) Magnetic confinement theory and modelling (Session D); Non-tokamak confinement systems (Session C). (Vol. 3) Inertial confinement fusion; ITER and next step devices; Technology and reactor concepts. (Vol. 4) Conference summaries.

Proceedings of the Fifteenth International Conference held in Seville, 26 September to 1 October 1994. The conference was characterized by valuable scientific results on virtually all aspects of controlled fusion and fusion technology, laying a solid foundation for continued progress. The proceedings include all the technical papers, the pertinent discussions, and five conference summaries which are published as a separate volume.

Contents: (Vol. 1) Artsimovich memorial lecture and toroidal confinement systems (Sessions A1 to A6). Toroidal confinement
systems overview (Session A1); Core plasma physics (Session A2); Heating and current drive (Session A3); Divertor and edge physics (Session A4); Concept optimization (Session A5); Helical system physics (Session A6); (Vol. 2) Combined poster session A2/A4 (Core plasma physics, and divertor and edge physics); Combined poster session A3/A5 (Heating and current drive, and concept optimization); Combined poster session A6/C (Helical system physics, and pinches and open systems); Pinches and open systems (Session C); ITER (Session E); New devices, reactors and technology (Session F). (Vol. 3) Inertial confinement fusion; Magnetic confinement theory; (Vol. 4) Conference summaries.

1: ISBN 92–0–102295–6
4: ISBN 92–0–101895–0
Price: Vol. 1: €165.69
Vol. 2: €165.69
Vol. 3: €151.16
Vol. 4: €20.35

WORLD SURVEY OF ACTIVITIES IN
CONTROLLED FUSION RESEARCH — 2001 Edition
Nuclear Fusion — Special Supplement 2001

This is the ninth edition of the World Survey of Activities in Controlled Fusion Research, presenting updated postal, web and e-mail addresses of nearly 300 laboratories and their staff active in fusion research worldwide. Information on the scientific and engineering programmes is given in the form of short descriptions of the main activities.

Contents: List of institutes, ordered by country and city and acronym; Laboratories, scientific staff and summaries of activities; Personnel Index.

The document is available as hard copy and CD-ROM.

STI/PUB/023/SPS/2001 (397 pp., 21 × 30 cm; 2001)
ISBN 92–0–101201–2
Price: €90.00

STI/DAT/023/SPS/2001 (CD-ROM)
ISBN 92–0–130702–0
Price: €35.00
ALPHABETICAL INDEX

Each title is listed under the first word. The numbers indicate the pages where the book is mentioned. Numbers in normal type mean there is a full entry on that page; numbers in italics mean that the book is mentioned by title only, although with a cross-reference to the entry containing full details. All titles published between 1 February 2001 and 31 July 2002 are printed in bold. Forthcoming titles are printed in italics.

Absorbed dose determination in external beam radiotherapy: An international code of practice for dosimetry based on standards of absorbed dose to water 11
Absorbed dose determination in photon and electron beams: An international code of practice — 2nd Edition 12
Applications of isotopes and radiation in conservation of the environment ........................................ 14, 17, 26

Atomic and plasma-material interaction data for fusion (Supplement to the journal Nuclear Fusion), Volume 1 6, 29
Atomic and plasma-material interaction data for fusion (Supplement to the journal Nuclear Fusion), Volume 2 6, 30
Atomic and plasma-material interaction data for fusion (Supplement to the journal Nuclear Fusion), Volume 3 7, 30
Atomic and plasma-material interaction data for fusion (Supplement to the journal Nuclear Fusion), Volume 4 7, 30
Atomic and plasma-material interaction data for fusion (Supplement to the journal Nuclear Fusion), Volume 5 8, 31
Atomic and plasma-material interaction data for fusion (Supplement to the journal Nuclear Fusion), Volume 6 8, 31
Atomic and plasma-material interaction data for fusion, Volume 7, Part A 8, 32
Atomic and plasma-material interaction data for fusion, Volume 7, Part B 9, 32
Atomic and plasma-material interaction data for fusion, Volume 8 9, 33
Atomic and plasma-material interaction data for fusion, Volume 9 10, 33
Atomic and plasma-material interaction data for fusion, Volume 10 10, 33
CIAMDA 98 20
CINDA A (1935–1987) 21
CINDA 2002 22
<table>
<thead>
<tr>
<th>Title</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code on the safety of nuclear research reactors: Design</td>
<td>17</td>
</tr>
<tr>
<td>Code on the safety of nuclear research reactors: Operation</td>
<td>17</td>
</tr>
<tr>
<td>Compendium of neutron spectra and detector responses for radiation protection purposes</td>
<td>22</td>
</tr>
<tr>
<td>Compendium of neutron spectra and detector responses for radiation protection purposes — Supplement to Technical Reports Series No. 318</td>
<td>23</td>
</tr>
<tr>
<td>Cytogenetic analysis for radiation dose assessment</td>
<td>13</td>
</tr>
<tr>
<td>Directory of nuclear research reactors 1998</td>
<td>18</td>
</tr>
<tr>
<td>Energy from inertial fusion</td>
<td>34</td>
</tr>
<tr>
<td>Fusion energy 1996</td>
<td>34</td>
</tr>
<tr>
<td>Guidebook on radioisotope tracers in industry</td>
<td>15, 27</td>
</tr>
<tr>
<td>Handbook on nuclear data for borehole logging and mineral analysis</td>
<td>23</td>
</tr>
<tr>
<td>Harmonization of Health Related Environmental Measurements Using Nuclear and Isotopic Techniques</td>
<td>15, 27</td>
</tr>
<tr>
<td>High dose dosimetry for radiation processing</td>
<td>13, 26</td>
</tr>
<tr>
<td>Market potential for non-electric applications of nuclear energy</td>
<td>5, 25</td>
</tr>
<tr>
<td>Measurement assurance in dosimetry</td>
<td>14</td>
</tr>
<tr>
<td>Nuclear fusion — Special issue, December 2001</td>
<td>35</td>
</tr>
<tr>
<td>Nuclear fusion — Yokohama special issues</td>
<td>36</td>
</tr>
<tr>
<td>Nuclear geophysics and its applications</td>
<td>11</td>
</tr>
<tr>
<td>Nuclear research reactors in the world — September 2000 Edition</td>
<td>18</td>
</tr>
<tr>
<td>Nuclear techniques in the exploration and exploitation of energy and mineral resources</td>
<td>16, 28</td>
</tr>
<tr>
<td>Plasma physics and controlled nuclear fusion research 1990</td>
<td>36</td>
</tr>
<tr>
<td>Plasma physics and controlled nuclear fusion research 1992</td>
<td>37</td>
</tr>
<tr>
<td>Plasma physics and controlled nuclear fusion research 1994</td>
<td>37</td>
</tr>
<tr>
<td>Safety assessment of research reactors and preparation of the safety analysis report</td>
<td>19</td>
</tr>
<tr>
<td>Safety in the utilization and modification of research reactors</td>
<td>19</td>
</tr>
<tr>
<td>World survey of activities in controlled fusion research — 2001 edition</td>
<td>38</td>
</tr>
</tbody>
</table>
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