

# Basic principles of fission reactors

Harper, Wallace Russell

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# Basic Principles Of Fission Reactors

**Los Alamos Scientific Laboratory**

A red circular graphic with a gradient, appearing as a semi-circle or a partial circle, located to the right of the Los Alamos Scientific Laboratory text.

## **Basic Principles Of Fission Reactors:**

*Nuclear Fission Reactors* I. R. Cameron, 2012-12-06 This book is intended to provide an introduction to the basic principles of nuclear fission reactors for advanced undergraduate or graduate students of physics and engineering The presentation is also suitable for physicists or engineers who are entering the nuclear power field without previous experience with nuclear reactors No background knowledge is required beyond that typically acquired in the first two years of an undergraduate program in physics or engineering Throughout the emphasis is on explaining why particular reactor systems have evolved in the way they have without going into great detail about reactor physics or methods of design analysis which are already covered in a number of excellent specialist texts The first two chapters serve as an introduction to the basic physics of the atom and the nucleus and to nuclear fission and the nuclear chain reaction Chapter 3 deals with the fundamentals of nuclear reactor theory covering neutron slowing down and the spatial dependence of the neutron flux in the reactor based on the solution of the diffusion equations The chapter includes a major section on reactor kinetics and control including temperature and void coefficients and xenon poisoning effects in power reactors Chapter 4 describes various aspects of fuel management and fuel cycles while Chapter 5 considers materials problems for fuel and other constituents of the reactor The processes of heat generation and removal are covered in Chapter 6

**Basic Principles of Fission Reactors** Wallace Russell Harper, 1961

**Fundamentals of Nuclear Science and Engineering** J. Kenneth

Shultis, Richard E. Faw, 2007-09-07 Since the publication of the bestselling first edition there have been numerous advances in the field of nuclear science In medicine accelerator based teletherapy and electron beam therapy have become standard New demands in national security have stimulated major advances in nuclear instrumentation An ideal introduction to the fundamentals of nuclear science and engineering this book presents the basic nuclear science needed to understand and quantify an extensive range of nuclear phenomena New to the Second Edition A chapter on radiation detection by Douglas McGregor Up to date coverage of radiation hazards reactor designs and medical applications Flexible organization of material that allows for quick reference This edition also takes an in depth look at particle accelerators nuclear fusion reactions and devices and nuclear technology in medical diagnostics and treatment In addition the author discusses applications such as the direct conversion of nuclear energy into electricity The breadth of coverage is unparalleled ranging from the theory and design characteristics of nuclear reactors to the identification of biological risks associated with ionizing radiation All topics are supplemented with extensive nuclear data compilations to perform a wealth of calculations Providing extensive coverage of physics nuclear science and nuclear technology of all types this up to date second edition of

**Fundamentals of Nuclear Science and Engineering** is a key reference for any physicists or engineer

**The Physics of Energy** Robert L. Jaffe, Washington Taylor, 2018-01-25 A comprehensive and unified introduction to the science of energy sources uses and systems for students scientists engineers and professionals

[Nuclear Reactors-physics, Design And](#)

Safety - Proceedings Of The Workshop A Gandini, J J Schmidt, S Ganesan, 1995-10-24 The lectures reported in these proceedings were given in the Workshop on Nuclear Reactors Physics Design and Safety held at the International Centre for Theoretical Physics in Trieste in 1994 by experts from leading international research institutions and industries They have been organized in a self consistent form with the objective of giving basic up dated information to scientists and engineers from developing countries in modern methods for the computation and analysis of nuclear reactors with particular emphasis on reactor physics design and safety *Nuclear Reaction Data And Nuclear Reactors: Physics, Design And Safety - Proceedings Of The Workshop (In 2 Volumes)* A Gandini, G Reffo, 1998-04-30 This book gathers together contributions by experts from leading international research institutions and industries The articles have been organized in a self consistent form with the objective of giving basic updated information to scientists and engineers from developing countries on modern methods for the computation and analysis of nuclear reactors with particular emphasis on reactor physics design and safety

**Nuclear Principles in Engineering** Tatjana Jevremovic, 2006-07-19 Nuclear engineering plays an important role in various industrial health care and energy processes Modern physics has generated its fundamental principles A growing number of students and practicing engineers need updated material to access the technical language and content of nuclear principles Nuclear Principles in Engineering is written for students engineers physicians and scientists who need up to date information in basic nuclear concepts and calculation methods using numerous examples and illustrative computer application areas Drawing upon years of practical experience and research Tatjana Jevremovic covers nuclear principles as they apply to Power production propulsion Electric generators for space applications Diagnostics and treatment in medicine Imaging Homeland security **Basic Principles of Power Reactors [videorecording]**. U.S. Atomic Energy Commission, 1962 An animated aid to understanding nuclear power reactors and how they produce steam for the generation of electricity The film briefly covers fission the controlled chain reaction and the function of basic reactor components The boiling water and pressurized water reactor concepts as well as types of fuel elements are explained **Introduction to Nuclear Power** Geoffrey F. Hewitt, John G. Collier, 2018-10-08 The authors of this text aim to educate the reader on nuclear power and its future potential It focuses on nuclear accidents such as Chernobyl and Three Mile Island and their consequences with the understanding that there are safety lessons to be learned if nuclear power generation is going to be expanded to meet our growing energy needs *Courses Catalog - University of Illinois at Urbana-Champaign* University of Illinois at Urbana-Champaign, 2002 Includes undergraduate and graduate courses **Thermal Analysis of Nuclear Power Plants** Minjun Peng, Zhaofei Tian, Genglei Xia, Hang Wang, 2025-09-30 This book highlights the thermodynamics analysis methods for thermal systems in PWR nuclear power plants encompassing both thermal balance and exergy analysis techniques The energy conversion efficiency in nuclear power plants has significant impact on their economy viability and market competitiveness By examining the size location and sources of energy loss within the thermal system of nuclear

power plants we can inform the design and operation to effectively enhance operational efficiency This book presents an overview of the thermal cycles utilized by various types of nuclear power plants encompassing both Rankine and Brayton cycles Additionally it elucidates the primary factors that impact the thermal efficiency of these cycles as well as the thermal balance method predicated on the first law of thermodynamics and exergy analysis method based on the second law The rationality and effectiveness of energy utilization in the process of energy transmission and conversion in PWR nuclear power plant thermal systems are identified based on the results of thermal balance calculation and exergy analysis Additionally measures to enhance the energy utilization level of nuclear power plants are proposed This book is suitable for graduate students of nuclear energy science and engineering and senior undergraduates of nuclear engineering and nuclear technology and thermal energy engineering It can also be used as a reference for technical personnel working in nuclear power plants The English translation of this book originally in Chinese was facilitated by artificial intelligence The content was later revised by the author for accuracy

**Understanding the Nuclear Reactor** Andrew William Kramer,1973

*American Book Publishing Record Cumulative, 1950-1977: Title index* R.R. Bowker Company. Department of Bibliography,1978 The Effects of Atomic Weapons Los Alamos Scientific Laboratory,1950 **Student Study Guide and Solutions Manual for Gener Al Physics** Morton M. Sternheim,1986 Principles of Design Improvement for Light Water Reactors Long-sun Tong,1988 **Energy Research Abstracts** ,1977 Semiannual with semiannual and annual indexes References to all scientific and technical literature coming from DOE its laboratories energy centers and contractors Includes all works deriving from DOE other related government sponsored information and foreign nonnuclear information Arranged under 39 categories e g Biomedical sciences basic studies Biomedical sciences applied studies Health and safety and Fusion energy Entry gives bibliographical information and abstract Corporate author subject report number indexes *Illinois Technograph* ,1951 **Power Plant Engineering** ,1972 *Fiftieth Anniversary, 1912-1962* Institute of Radio Engineers,1962

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