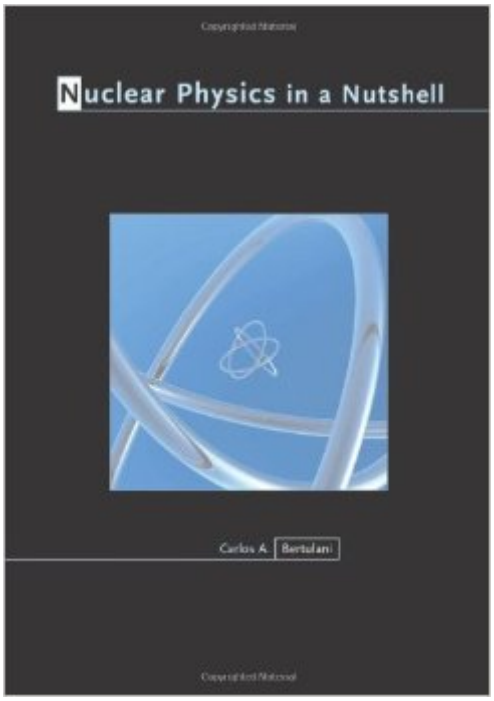
Nuclear Physics In A Nutshell



Synopsis

Nuclear Physics in a Nutshell provides a clear, concise, and up-to-date overview of the atomic nucleus and the theories that seek to explain it. Bringing together a systematic explanation of hadrons, nuclei, and stars for the first time in one volume, Carlos A. Bertulani provides the core material needed by graduate and advanced undergraduate students of physics to acquire a solid understanding of nuclear and particle science. Nuclear Physics in a Nutshell is the definitive new resource for anyone considering a career in this dynamic field.The book opens by setting nuclear physics in the context of elementary particle physics and then shows how simple models can provide an understanding of the properties of nuclei, both in their ground states and excited states, and also of the nature of nuclear reactions. It then describes: nuclear constituents and their characteristics; nuclear interactions; nuclear structure, including the liquid-drop model approach, and the nuclear shell model; and recent developments such as the nuclear mean-field and the nuclear physics of very light nuclei, nuclear reactions with unstable nuclear beams, and the role of nuclear physics in energy production and nucleosynthesis in stars.Throughout, discussions of theory are reinforced with examples that provide applications, thus aiding students in their reading and analysis of current literature. Each chapter closes with problems, and appendixes address supporting technical topics.

Book Information

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Customer Reviews

There appears to be a lack of clearly written, more than merely descriptive, textbooks in the arena of

Nuclear Physics.(Falling, as it does, between the easier text of Jelley (1990) and the more advanced text of Wong (1990)).Prerequisite: A course in Quantum Mechanics and the usual undergraduate mathematics curricula, this textbook thus serves a definite, welcome, need.The text is then accessible to fourth year students, and useful beyond.The endorsement from the book's back cover accurately conveys it's strengths: "A thorough development of three main topics: Hadrons, Nuclei, Stars."Quark structure described first; here, in 25 pages. (Jelley gives Quarks a mention, Wong elaborates to 40 pages.).The trinity--Alpha, Beta, and Gamma decay, are given separate chapters. (As seems customary).Two chapters convey Nuclear Reactions; text concluding with a chapter devoted to Astrophysics and another to Rare Isotopes.Roughly 60 pages of appendices span angular momentum, symmetries and relativistic quantum mechanics.(Appendix D: itself a veritable compendium of Relativistic Quantum Mechanics.)The chapters pertaining to Gamma Decay (beginning with fields and gauge invariance,ending with Mossbauer Effect)and Nuclear Astrophysics (emphasizing calculation of reaction rates in Stars) are particularly clear and instructive.A nice discussion, almost complete derivation, of semi-emperical mass formula ; This same formula is merely statedin the text of Jelley and given much (more advanced) elaboration in Wong. Another section, Liquid-Drop Model, is givenmore discussion than Wong, and more elaboration than Jelley. Effective Field Theories given nice advertisement (Page 95).

Gas Law in a Nutshell, (Nutshell Series) 5th (fifth) edition