er hybrid instability). In addition, a summary is given of the types of vertical flows that can occur in the topside ionosphere, particularly involving mass transport into the magnetosphere. This section is disappointing in its outdatedness. The most recent reference is from 1982, and much of the recent literature on heavy-ion outflow perturbations of the topside ionosphere is ignored.

Again, the high-latitude dynamical processes are described both theoretically and observationally, from largest to smallest scales, including the global structure of the aurora, gradient-drift, current-driven, and flow-shear-driven instabilities, all as candidates for the generation of observed structures and fluctuation spectra within the ionosphere.

Overall, this book will be an extremely useful teaching tool and research summary for workers in ionospheric plasma physics. It provides an excellent blend of theory and observational data, thereby making evident those areas that hold promise for future research.

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Nuclei and Particles

Weak Interactions in Nuclei. BARRY R. HOLSTEIN. Princeton University Press, Princeton, NJ, 1989. x, 247 pp., illus. $49.50. Princeton Series in Physics.

Holstein's aim in this book is to demonstrate the usefulness and excitement of recent developments in weak interactions and their applications to nuclei, which can serve as testing grounds of the fundamental physics involved. He succeeds in this multiple endeavor. In addition, the book shows the rapprochement of nuclear and particle physics.

The author assumes that the reader has a sound knowledge of quantum mechanics and the foundations of nuclear and particle physics. Detailed derivations sometimes are lacking, but numerous references are included. The monograph is thus aimed at advanced graduate students and researchers, particularly those in nuclear physics. Holstein does not attempt to cover all of weak interactions in nuclei but concentrates mainly on those aspects that have a connection to fundamental interactions and concepts or to particle physics. The choice of topics is directly related to his own research work. He often gives insightful and instructive descriptions and order-of-magnitude arguments.

The book begins not with weak interactions but with the strong ones, that is, with a description of the quark model. This introduction is followed with the basics of weak interactions, and particularly the Weinberg-Salam model. Gauge invariance and spontaneous symmetry-breaking are included in this description, but the reasons for an $SU(2) \times U(1)$ model or for a Higgs *Doublet*, for example, are not given but assumed to be known.

Symmetries, particularly those relevant to weak interactions, are introduced early. The evidence for parity (P) and combined charge-conjugation and parity invariance (CP) is presented. Indeed, the close relationship and complementarity of theory and experiment are highlighted throughout the text; many good examples appear, such as nuclear studies of the non-leptonic weak interactions through parity violation.

Neutrinos, their interactions and their importance, are stressed in a chapter that includes astrophysics and the solar neutrino problem. Here the author clearly shows the relations among various fields—astrophysics and particle and nuclear physics—and the present interest and excitement in this area.

Finally the book introduces exchange currents for strong, electromagnetic, and weak interactions and ends with a description of some open problems where these currents are important.

The reader who has a reasonably sound basic knowledge of nuclear and particle physics will find this book particularly helpful. She or he will need to consult some of the references at the end of each chapter to fill in some of the missing details. The lively description of the physics makes this book appealing and welcome.

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