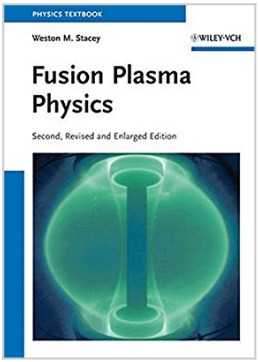

Fusion Plasma Physics

By Weston M. Stacey

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This revised and enlarged second edition of the popular textbook and reference contains comprehensive treatments of both the established foundations of magnetic fusion plasma physics and of the newly developing areas of active research. It concludes with a look ahead to fusion power reactors of the future. The well-established topics of fusion plasma physics -- basic plasma phenomena, Coulomb scattering, drifts of charged particles in magnetic and electric fields, plasma confinement by magnetic fields, kinetic and fluid collective plasma theories, plasma equilibria and flux surface geometry, plasma waves and instabilities, classical and neoclassical transport, plasma-materials interactions, radiation, etc. -- are fully developed from first principles through to the computational models employed in modern plasma physics.
The new and emerging topics of fusion plasma physics research -- fluctuation-driven plasma transport and gyrokinetic/gyrofluid computational methodology, the physics of the divertor, neutral atom recycling and transport, impurity ion transport, the physics of the plasma edge (diffusive and non-diffusive transport, MARFEs, ELMs, the L-H transition, thermal-radiative instabilities, shear suppression of transport, velocity spin-up), etc. -- are comprehensively developed and related to the experimental evidence. Operational limits on the performance of future fusion reactors are developed from plasma physics and engineering constraints, and conceptual designs of future fusion power reactors are discussed.

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Editorial Review

Review

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From the Back Cover

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About the Author
Professor Stacey received his PhD in Nuclear Engineering from the Massachusetts Institute of Technology in 1966. He then worked in naval reactor design at Knolls Atomic Power Laboratory and led the fast reactor theory and computations and the fusion research programs at Argonne National Laboratory. In 1977, he became Callaway Professor of Nuclear Engineering at the Georgia Institute of Technology, where he has been teaching and performing research in reactor physics and plasma physics. He is the author of six books and about 250 research papers. He led the international INTOR Workshop which defined the design features and R&D needs for the first fusion experimental reactor, for which he received the US Dept. of Energy Distinguished Associate Award. Professor Stacey is a Fellow of the American Nuclear Society and of the American Physical Society and is the recipient of, among other awards, the Seaborg Award for Nuclear Research and the Wigner Reactor Physics Award from the American Nuclear Society.

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