

PLASMA PHYSICS AND FUSION ENERGY

There has been an increase in worldwide interest in fusion research over the last decade due to the recognition that a large number of new, environmentally attractive, sustainable energy sources will be needed during the next century to meet the ever increasing demand for electrical energy. This has led to an international agreement to build a large, \$4 billion, reactor-scale device known as the “International Thermonuclear Experimental Reactor” (ITER).

Plasma Physics and Fusion Energy is based on a series of lecture notes from graduate courses in plasma physics and fusion energy at MIT. It begins with an overview of world energy needs, current methods of energy generation, and the potential role that fusion may play in the future. It covers energy issues such as fusion power production, power balance, and the design of a simple fusion reactor before discussing the basic plasma physics issues facing the development of fusion power – macroscopic equilibrium and stability, transport, and heating.

This book will be of interest to graduate students and researchers in the field of applied physics and nuclear engineering. A large number of problems accumulated over two decades of teaching are included to aid understanding.

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