
Foreword

Fusion energy is the internal power source of the sun and the stars. Resisting natural forces of separation, lighter elements, such as hydrogen and helium, are forcibly joined together to form the nucleus of a heavier element of slightly less mass than the sum of its original parts. In accord with Einstein's now familiar equation, this small difference in mass is converted into an enormous amount of energy, which we ultimately observe as heat and light from the sun.

In the stars, this process is made possible by the extraordinary physical conditions under which matter in the core of a star is compressed to high densities and heated to high temperatures by the nearly unimaginable gravitational weight of the rest of the star. Today, scientists on earth hope to find equivalent conditions with an array of large machines.

Although a practical fusion energy device is still well in the future, the

potential benefits are enormous. The fuel could be extracted from ordinary sea water in virtually inexhaustible supply. The heat and power produced could provide energy for future generations long after the earth's inventory of conventional fossil fuels had been depleted.

In this relatively brief document, some of the more important contributions of the research program needed to establish the scientific and technical base for fusion power production are discussed. The number of contributions has grown steadily and at an increasing pace. I have every confidence that this research program will meet its future challenges.



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