
Origins of the Research Program

The Department of Energy's (DOE's) Magnetic Fusion Energy (MFE) Program is aimed at capturing the fusion processes that power the sun and the stars and harnessing them on earth. The program is building the scientific and technical base that must be in place for commercial development of magnetic fusion energy as a major new source of power.

The long-term attractiveness of fusion as an energy option is based on two key factors: the potential of a readily available, vast and secure fuel reserve in sea water, and the intrinsic environmental and safety advantages of fusion energy. Fusion is one of the very few energy options that could provide mankind's energy into the distant future and meet the Nation's high National standards for public health and safety.

The MFE Program, now managed by DOE's Office of Fusion Energy, had its origins in the early 1950's. It began with grassroots enthusiasm for fusion research, initiated by scientists connected with the National Laboratories. It soon became evident, however, that achieving the capability to produce fusion power on earth would take decades of research and development. Despite the extraordinary economic potential of developing an essentially inexhaustible supply of energy, launching such an extended research and development effort required investment by the Federal Government. In July 1951, the Atomic Energy Commission awarded a grant to Princeton University to conduct studies on magnetic fusion; and with that, the

United States program in magnetic fusion was off the ground.

Evolution of the MFE Program

The period from 1951 to 1958 saw tremendous scientific creativity and growth in the development of magnetic fusion. Emphasis was on laboratory experimentation directed toward constructing a prototype fusion device. Between 1952 and 1955, the performance of experimental devices improved a thousandfold but fell short of that required for practical fusion power. In the late 1950's, United States, British, and Soviet magnetic fusion programs were declassified under the United States Atoms for Peace Initiative. This fostered an environment for international cooperation and open scientific exchange that has characterized and nourished the program ever since.

By the end of 1957, British researchers, with whom United States scientists were cooperating and sharing results, reported experimental results suggesting that one of their fusion machines had reached the point at which it could be scaled up to a commercial fusion power device. Unfortunately, further tests proved otherwise; and this led to a widespread realization within the fusion community that more emphasis was needed on expanding the theoretical and scientific foundations upon which fusion science was based.

Then followed a decade of scientific progress, based primarily on