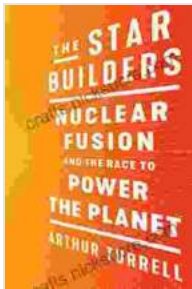


Nuclear Fusion: The Race to Power the Planet

What is Nuclear Fusion?

Nuclear fusion is the process of combining two atomic nuclei into one, releasing a great amount of energy. It is the process that powers the sun and other stars, and it is a promising source of energy for Earth.



The Star Builders: Nuclear Fusion and the Race to Power the Planet by Arthur Turrell

★★★★☆ 4.3 out of 5

Language	: English
File size	: 3563 KB
Text-to-Speech	: Enabled
Screen Reader	: Supported
Enhanced typesetting	: Enabled
Word Wise	: Enabled
Print length	: 271 pages



Nuclear fusion is different from nuclear fission, which is the process of splitting an atomic nucleus into two smaller nuclei. Nuclear fission is the process that is used in nuclear power plants today.

How Does Nuclear Fusion Work?

Nuclear fusion occurs when two atomic nuclei are brought close enough together to overcome the electrostatic repulsion between them and fuse together. This process releases a great amount of energy, in the form of heat and radiation.

The most common type of nuclear fusion reaction is the fusion of deuterium and tritium, two isotopes of hydrogen. This reaction produces helium and a neutron, and releases a great amount of energy.

The Benefits of Nuclear Fusion

Nuclear fusion has a number of benefits over other sources of energy, including:

- **It is a clean source of energy.** Nuclear fusion does not produce any greenhouse gases, which contribute to climate change.
- **It is a safe source of energy.** Nuclear fusion reactions are very stable and do not produce any radioactive waste.
- **It is a plentiful source of energy.** Deuterium and tritium, the fuels for nuclear fusion, are abundant on Earth.
- **It is a sustainable source of energy.** Nuclear fusion can provide a reliable and affordable source of energy for centuries to come.

The Challenges of Nuclear Fusion

Despite its many benefits, nuclear fusion is still a very challenging technology to develop. Some of the challenges include:

- **Creating and maintaining a plasma.** A plasma is a state of matter that is composed of charged particles. Nuclear fusion reactions only occur in a plasma, so it is important to be able to create and maintain a stable plasma.
- **Heating the plasma to high temperatures.** Nuclear fusion reactions only occur at very high temperatures, so it is important to be able to

heat the plasma to these temperatures.

- **Confining the plasma.** Nuclear fusion reactions only occur when the plasma is confined in a small space. This is a very difficult task, as the plasma is very hot and can easily escape.

The Future of Nuclear Fusion

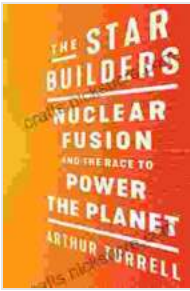
Despite the challenges, nuclear fusion is a very promising source of energy for the future. Researchers around the world are working to overcome the challenges and develop a practical nuclear fusion reactor.

The ITER project is one of the largest and most ambitious nuclear fusion projects in the world. ITER is a tokamak, a type of nuclear fusion reactor that uses a magnetic field to confine the plasma. ITER is being built in France, and it is expected to be completed in 2025.

If ITER is successful, it will be a major milestone in the development of nuclear fusion. ITER will provide valuable data that will help researchers to design and build a practical nuclear fusion reactor.

Nuclear fusion is a promising source of energy for the future. It is clean, safe, plentiful, and sustainable. However, there are still a number of challenges that need to be overcome before nuclear fusion can be used to generate electricity on a commercial scale.

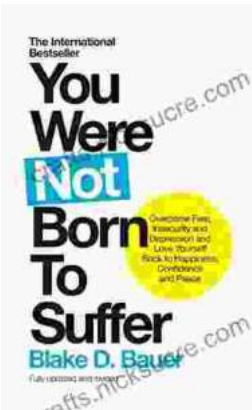
The ITER project is a major step towards the development of a practical nuclear fusion reactor. If ITER is successful, it will provide valuable data that will help researchers to design and build a nuclear fusion reactor that can power the planet.



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