Schematic diagram of solar nuclear fusion device

How does nuclear fusion work?

Fig. 1: Schematics showing the toroidal,poloidal,and combined magnetic fields inside a tokamak. The resultant field ends up surrounding and stabilizing the plasma. Source: Wikimedia Commons) Nuclear fusion is a process that can be used to make electrical energy by combining light atomic nuclei to form heavier ones.

What is nuclear fusion?

Nuclear Fusion is the power of the sun and all shining stars in the universe. Controlled nuclear fusion toward ultimate energy sources for human beings has been developed intensively worldwide for this half a century. A fusion power plant is free from concern of exhaustion of fuels and production of CO 2.

What is the energy source of a fusion reactor?

The energy source of a fusion reactor is the burning plasma in the core. In this chapter,the principle to confine the plasma leading to burning is described. Conceptual schematic view of a fusion power plant Fusion reaction requires temperature beyond 100 million°C which is higher than in the core of the sun by more than one order of magnitude.

How difficult is it to design a nuclear fusion device?

The difficulties of designing nuclear fusion devices is not only limited to takamak reactors, but covers the entire range of nuclear fusion systems. These complexities pose a great hindrance that needs to be overcome if nuclear fusion is to become a feasible energy source in the near future.

What is a fusion reactor?

Seven parties in the world share the responsibility of construction A fusion reactor is basically a large-scale electromagnetic and nuclear devicewhich requires extremely high-level integration of engineering and physics. Steady-state control of the plasma is a primary demand. Safety and materials are also key issues.

How big is a plasma fusion reactor?

Its plasma volume is close to 1,000m 3(see Fig. 17),and the total weight reaches 23,000 t. The plasma major radius is 6.2 m (12.4m in diameter) which is twice the size of existing large tokamak devices. The magnetic field is 5.3 T. The goal of ITER is the demonstration of control of burning plasma and engineering feasibility of a fusion reactor.

The easiest nuclear fusion reaction to obtain on Earth occurs with use of two isotopes of hydrogen (Deuterium and Tritium), these two elements are used in research on controlled thermonuclear...

This ebook entitled "The Explainer: Nuclear Fusion" is intended to people who wanted to know what is nuclear fusion. This includes topics on (1) What is a nuclear reaction? (2) describing nuclear...

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A table-top Inertial Electrostatic Confinement (IEC) Fusion device was constructed at Houghton College to explore the properties of plasmas and the nuclear reactions that may be induced in ...

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Thermal storage. The tokamak principle is used in all current designs of demonstration fusion power plants. But because the tokamak is a pulse device, it is possible that the reactor will not be able to operate continuously, at least in the early phases.

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