

# Solar power generation and controlled nuclear fusion

What is nuclear fusion?

Nuclear fusion is a process in which two atomic nuclei come together to form a heavier nucleus, releasing an enormous amount of energy. It is the same process that powers the Sun and other stars.

How does nuclear fusion produce energy in the Sun?

The most prevalent fusion process in the Sun is the proton-proton chain reaction, in which four hydrogen nuclei combine through a series of steps to produce one helium nucleus, along with positrons, neutrinos, and gamma-ray energy. This mechanism constitutes the core of nuclear fusion in the Sun. How Does Nuclear Fusion Generate Energy in the Sun?

Can nuclear fusion be used as an energy source?

A team at the National Ignition Facility (NIF) in California announced it had extracted more energy from a controlled nuclear fusion reaction than had been used to trigger it. It was a global first and a significant step for physics--but very far from enabling practical exploitation of fusion as an energy source.

Will fusion reactors be regulated by 2027?

In the USA, the Nuclear Energy Innovation and Modernization Act includes fusion reactors, and the Nuclear Regulatory Commission is to establish a regulatory framework by 2027. They have already decided to subject fusion reactors to the same regulations as particle accelerators and to separate them from nuclear reactors.

Last December physicists working on fusion claimed a breakthrough. A team at the National Ignition Facility (NIF) in California announced it had extracted more energy from a controlled ...

The ultimate goal of developing an artificial sun is to replicate the nuclear fusion processes that occur in the sun, providing humanity with a limitless and clean energy source, and ...

There was some indication that the two projects involving palladium merited further study. Assessing fusion power The use of fusion power plants could substantially reduce the environmental impacts ...

Armed with cutting-edge fusion energy technologies and bold venture backing, a generation of young Chinese innovators is aiming to shrink the power of the sun into scalable, ...

Furthermore, the study shows that there is a steadily increasing accumulation of scholarly knowledge on nuclear fusion and a broad consensus among the leading experts that nuclear fusion is the ...

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 over this ...

Learn how nuclear fusion in the Sun powers energy generation, making it a sustainable and enduring sun power source for billions of years.

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Leading nuclear physicist and vice-president of the IOP, Professor Martin Freer, explains how nuclear fusion works and could transform the future of energy generation. The processes by which stars, such as the ...

China's EAST nuclear fusion reactor has successfully kept plasma stable at extreme densities, passing a major fusion milestone and potentially bringing humanity closer to wielding near ...

At the core of this progress is the pursuit of controlled nuclear fusion, a process that mimics the energy generation of the sun.

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