

## FEATURE

# EAST - How China's 'artificial sun' is an efficient alternative to our Sun

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*The raw material required to release nuclear fusion is inexhaustibly available in the ocean, which makes this device a continuous clean energy provider to the world.*

China's "artificial sun" has achieved a plasma temperature of 100 million degrees Celsius, and a heating power of 10 megawatts.

China developed this device to harness the energy of fusion along with EAST. This is the first country in the world to develop such equipment on its own. (*[The Experimental Advanced Superconducting Tokamak \(EAST\)](#)*,

*internal designation HT-7U, is an experimental superconducting tokamak magnetic fusion energy reactor in Hefei, China)*

In stable fusion, a temperature of 100 million Celsius is one of the most fundamental elements.

Fusion is only possible if the central temperature reaches 100 million C (180 million F) and this temperature makes it six times hotter than the core of the burning star, which has a temperature around 15 million C (27 million F).

#### About the experiment

The Institute of Plasma Physics, affiliated with the Chinese Academy of Sciences announced on its website that various data points achieved in the experiments are close to meeting physics' demand for future steady-state fusion reactor operation.

It also provides an important technological basis for mankind's development of clean nuclear energy, said the institute.

Nuclear fusion demands high temperature and great pressure. Since the pressure can't be achieved on earth, people can only raise the temperature to at least 100 million C, according to the latest research.

#### About EAST

China independently designed and built EAST in 2006 in Hefei which is in the Anhui province of east China.

This equipment is 11 meters tall, with a diameter of 8 meters, and a weight of 400 tons.

The device is called an "artificial sun" as it aims to release nuclear fusion like that of the sun by using deuterium and tritium, which widely exist in sea water, and thus could continuously provide clean energy for humanity.

After setting a world record by achieving 101.2 seconds of steady-state H-mode operation

of EAST in 2017, scientists started their research on physical mechanism of the core under high power heating in 2018, said the institute.

Achievements realized in 2018 in EAST experiments will provide important and direct experience for the construction of the **International Thermonuclear Experimental Reactor (ITER)**.

This will be a large international scientific project with a global collaboration of 35 countries including China, Russia and the US.

It also will provide experimental evidence and scientific support for China's ongoing China Fusion Engineering Test Reactor (CFETR) project, the institute said.

Compared with ITER, although smaller, EAST is similar to ITER in shape and equilibrium, yet more flexible.

During the 10 years of ITER construction, EAST will be one of only a few international devices that can serve as an important experimental test bench for conducting ITER-related steady-state advanced plasma science and technology research, according to the institute.

#### BENEFITS OF NUCLEAR FUSION

Nuclear fusion is arguably the best way for humans to generate energy.

The required raw materials -- deuterium and tritium -- are easily available in the oceans.

Nuclear fusion also doesn't produce any harmful radioactive waste and hence, is extremely environment-friendly.