

Korea's 'artificial sun' sets a new record, withstanding 100 million degrees Celsius and maintaining it for nearly 50 seconds

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At a temperature of 100 million degrees Celsius, heavy hydrogen isotopes existing in the plasma are forced to fuse together, and release energy similar to the active core of the Sun. The reactor can produce clean, almost limitless energy if maintained in this state.

However, for nuclear fusion reactions in general, the big challenge is to prevent plasma from escaping using magnetic fields.

To overcome the problem, KSTAR uses a new diverter made of tungsten, a material with a very high melting temperature, but does not absorb plasma.

The new diverters completed installation in 2023. Official use of the new diverters extended the reactor's operating time to 48 seconds.



Researchers from the Princeton Plasma Physics Laboratory also found a way to stabilize weak spots at the plasma edges caused by microscopic defects in the magnetic coils to help the reactor achieve its second milestone, containing plasma in high isolation mode - or "H mode" - for 102 seconds. This operation was limited to just a few seconds in previous attempts.

According to researchers, Korea's 'Artificial Sun' promises to bring more potential for the production of clean energy sources of the future.

The Korean researchers' goal is to achieve 300 seconds of plasma operation with temperatures above 100 million degrees Celsius by the end of 2026. However, this time is still a few minutes shorter than the experimental superconducting Tokamak reactor. China's advanced test (EAST), which can create and maintain plasma for nearly 7 minutes, as of April 2023.

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