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Hydrogen/Boron Nuclear Fusion Success

NIFS (National Institute for Fusion Science) and American Startup

NIFS announced that they, together with the American fusion startup TAE Technologies (California), had succeeded in nuclear fusion experiments using a new fuel combination of light hydrogen (ordinary hydrogen) and boron to make fusion reactions.

Among the targets for future practical use, though nuclear fusion power generation generally assumes the use of deuterium and tritium (heavy hydrogen) as fuel, National Institute for Fusion Science says that the present approach (hydrogen-boron) is superior in the lack of neutron production. In nuclear fusion electricity generation, in general, the fusion of the fuel of deuterium and tritium resulting in heavier nuclei of helium has been considered. In contrast in the case of proton-boron fusion, it is said that after the fusion reactions, as they produce only helium nuclei and not neutrons, it is possible to make cleaner fusion electric generation.

Possibility of realizing clean nuclear fusion power generation of helium was captured by the TAE detector. It is assumed that the measurement results were as expected and that the nuclear fusion reaction was verified. It is assumed that the enormous amount of energy generated in is.

There are companies that are still in the research stage and are aiming for practical application in the 2030s. When deuterium and tritium are used as fuel, there is the problem that the neutrons produced by the reaction damage the outer walls of the fusion reactor.

In contrast with this, the research team uses experimental equipment at the National Institute for Fusion Science. Experiments were carried out using a type of large helical device (LHD). When boron powder is added from above to hydrogen plasma (ionized gas) confined in a donut shape in a strong magnetic field, injected protons were at speeds exceeding 15 million km per second, which collided with boron nuclei, which generated helium nuclei with high energies. This amounts to the verification of this particular fusion process, as they expected.

TAE is a nuclear fusion startup founded in 1998 with the aim of generating nuclear fusion power using hydrogen and boron. Toshiki Tajima, a professor at the University of California in the United States, who is known for his research on plasma electron acceleration using lasers, who is also a candidate for the Nobel Prize, serves as Chief Science Officer of TAE.