

# N.Korea boasts success in nuclear fusion

12 May 2010, by Park Chan-Kyong

North Korea on Wednesday claimed it had carried out a nuclear fusion reaction that could lead to a limitless supply of clean energy -- a process that the world's scientists have so far yet to achieve.

Physicists worldwide are striving to develop a nuclear fusion power plant, a project which the International Atomic Energy Agency terms "a great challenge".

But North Korea said it had triumphed using its own technology.

"The successful nuclear fusion marks a great event that demonstrated the rapidly developing cutting-edge science and technology of the DPRK (North Korea)," said Rodong Sinmun, the newspaper of the ruling communist party.

It said the North's experts had worked hard to develop the "safe and environment-friendly new energy" technology their own way.

"Korean style" [thermonuclear reaction](#) devices were designed and manufactured as part of the process, it added.

South Korean experts doubted that the North -- which suffers persistent power shortages in everyday life -- has made major progress in a process which potentially promises clean and limitless energy.

Yang Hyung-Lyeol, of South Korea's state-funded National Fusion Research Institute, said: "I don't think the North has any technology that we are not aware of. If so, it would mean the North would be on top of the world."

Nuclear fusion reactions can also be employed to make hydrogen bombs. But Yang said Wednesday's announcement did not seem linked to the North's atomic weapons programme.

Yang said there is little possibility of the technology being used for weapons. "Judging from

technological terminology used in the announcement, the development has nothing to do with weaponising."

Yang said he was sceptical the North has technology or facilities on a par with advanced countries.

"North Korea may have begun operating a small-scale magnetic nuclear fusion device but you cannot draw any parallel with our own [fusion reactor](#) KSTAR and other reactors in the world," he told AFP.

South Korea is a partner in the International Thermonuclear Experimental Reactor (ITER) project to build a fusion power plant by the mid 2030s. Other key members include the United States, European Union members, Japan, Russia, China and India.

"Nuclear fusion research has been jointly conducted by key industrial states in the form of ITER and related technology is quite open in public and shared by many countries," Yang said.

The North said the achievement was made to mark the Day of the Sun -- the anniversary on April 15 of the birth of founding president Kim Il-Sung.

Nuclear fusion expert Lee Choon-Geun of South Korea's state-financed Science and Technology Policy Institute said the North had been conducting research in this field since the early 2000s.

"But it all comes down to budget and facilities. I don't think the North has such facilities as we and other advanced countries have."

The North has for decades had a nuclear weapons programme based on plutonium produced from spent fuel at its Yongbyon reactor. US Secretary of State Hillary Clinton has estimated it has up to six atomic weapons.

Last September it announced for the first time that

it had reached the final stage of enriching uranium, a second way of making nuclear bombs.

Six-nation talks aimed at shutting down the North's nuclear programmes have been stalled since December 2008. In April last year the North announced it was quitting the forum.

It staged its second atomic weapons test the following month, incurring tougher United Nations sanctions.

### **Background: Nuclear fusion: North Korea claims Holy Grail of energy**

North Korea's claim on Wednesday to have carried out nuclear fusion touches on a vision of cheap, green, endless energy that is mustering billions of research dollars among advanced economies and, say experts, may take decades to achieve.

Instead of splitting the atom -- the principle behind the atomic bomb and present-day nuclear reactors -- fusion entails ramming the nuclei of light atomic elements together to make heavier elements and in the process release huge amounts of energy.

In essence, it is the same principle that powers the stars. In the Sun, mighty gravitational forces crush hydrogen atoms together to produce helium, with solar energy the byproduct.

Replicating stellar power on Earth, though, means overcoming a daunting array of technical and financial hurdles and drawing on expertise from many fields and different countries.

So the sketchy claims by the impoverished, enclosed Communist state are bound to be eyed with scepticism.

Rodong Sinmun, the newspaper of Pyongyang's ruling communist party, said the North's experts had developed nuclear fusion using a "Korean-style" thermonuclear device.

"The successful nuclear fusion marks a great event that demonstrated the rapidly developing cutting-edge science and technology of the DPRK (North Korea)," it said.

Under fusion, a huge jolt of heat, to nearly 100 million degrees Celsius (180 million degrees Fahrenheit) would kickstart the process, fusing atomic nuclei and containing them in a charged gas called a plasma.

Getting the process started is only one problem. Another is how to sustain it and contain the plasma so that the cloud of particles do not escape.

Then there is the big energy equation -- the cost in energy it takes to pump up the plasma to such high temperatures in comparison with the yield this brings.

So far, despite steady improvements, no one has achieved a self-sustaining fusion event longer than a few minutes and input/yield ratios remain low.

Current projects in [nuclear fusion](#) are only at the early experimental stage and have each required commitments of billions of dollars just to be initiated.

A European-led initiative is the International Thermonuclear Experimental Reactor (ITER), located Cadarache, southern France, scheduled to start plasma experiments in 2018 and if successful lead to a commercial reactor in the 2030s.

The backers in the 10-billion-euro scheme are the European Union (EU), which has a 45-percent share, China, India, South Korea, Japan and Russia as well as the United States.

The idea is to have fusion in a reactor fuelled by two isotopes of hydrogen -- deuterium and tritium -- with helium as the waste product in addition to the energy.

The plasma would be contained in a magnetic field in a doughnut-shaped vessel called a tokamak.

Looking at the key issue of fusion ignition, the United States has built the world's largest laser, a 3.5-billion-dollar behemoth covering the size of two football pitches, at the Lawrence Livermore National Laboratory in California.

The idea is for 192 laser beams to zap fuel tiny

pellets of beryllium, plastic or high-density carton, so compressing the fuel that temperatures of 111 million C (200 million F) are briefly reached.

Tested for the first time in January, the lasers fire 40 times more power than the average consumption of the entire planet, albeit for only a few nanoseconds.

Fusion's supporters say the abundance of raw materials is almost infinite and the energy itself and its waste products are far safer than with fission, for there is no critical mass. Critics say the research billions would be better spent on improving current clean renewable sources, such as wind, solar and wave energy.

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