

Hopeful Future of Nuclear Fusion Generation

Shota Saito

Do you know what nuclear fusion is? Nuclear fusion is an amazing process that powers our sun and stars. Next, do you know the history of the discovery of nuclear fusion? Scientists have been interested in it for over 100 years. Let's look at the history!

In 1939, two scientists, Otto Hahn and Fritz Strassmann, made an important discovery called nuclear fission. Fission is the splitting of the nucleus of an atom. This discovery helped scientists further understand nuclear reactions. During the 1940s and 1950s, scientists such as Enrico Fermi, Hans Bethe, and Edward Teller performed many experiments and studies to learn about fusion. They wanted to know how to combine atoms rather than break them apart. Then, in the 1950s, two Soviet scientists, Igor Tamm and Andrei Sakharov, devised a special device called tokamak. tokamak made it possible to create the high temperatures and pressures needed for fusion. Since then, scientists around the world have been working together to learn more about fusion and to make it practical for power generation!

While there is still much work to be done, fusion holds great promise for the future. It has the potential to bring us a clean and nearly limitless source of energy! Even today, scientists are excited to continue exploring ways to make fusion power generation a reality. Remember, the discovery of fusion is a fascinating journey that scientists are still on.

Sometimes physics has been used in the wrong way. Nuclear fusion was no exception. If nuclear energy is used in war, many people will die. We must always use science peacefully. Fusion is the next generation of energy and must be used peacefully to benefit everyone on the Earth. Fusion power is a treasure for mankind and will protect our beautiful planet. Create a bright future!

The first researchers were very interested in nuclear fusion because of its ability to produce vast amounts of energy, much like the Sun! They wanted to understand it in detail and find ways to control the vast amounts of energy and use it to generate electricity!

Fusion is a special kind of reaction in which small particles called atoms combine to form larger atoms. When this happens, an enormous amount of energy is released, just like the sun. With the potential to provide us with an almost unlimited source of power, quite a few people were fascinated by the idea of harnessing this energy. Are you fascinated? The sun uses nuclear fusion to produce heat and light.

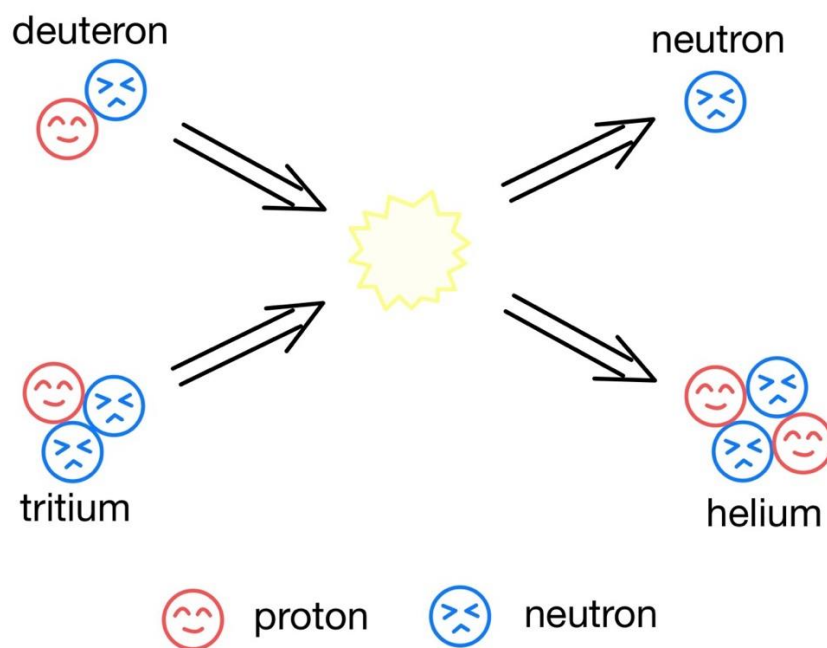
Hydrogen is compressed under extreme heat and pressure. To make matters a little more complicated, as you can see in the diagram, deuterium(^2H) and tritium(^3H) are fused together to produce helium(^4He) and neutron(n), releasing enormous amounts of energy in the process, $^2\text{H} + ^3\text{H} \rightarrow ^4\text{He} + \text{n}$.

Researchers had hoped to replicate this process on the Earth! However, it turned out to be very difficult to create nuclear fusion on Earth. It requires much higher temperatures and pressures than those we encounter in everyday life. Despite the difficulties along the way, scientists are still working hard to make fusion a reality. I believe they will revolutionize the way we generate electricity and bring about a brighter future for all of us. Why not be a part of building that future?

Fusion-based power generation has the potential to change the way we think and act in many ways. It may or may not be related to our daily life. First, it is a clean and safe energy source. Unlike conventional power sources such as coal or gas, fusion produces energy without producing harmful pollutants or greenhouse gases. This means that successful fusion will help protect the environment and reduce air pollution. We can breathe cleaner air and build a healthier planet for ourselves and future generations. Second, it provides nearly unlimited energy. Fusion-based power generation can provide an almost unlimited supply of energy. Fusion reactions use a special fuel called hydrogen, which is abundant in water and other substances. If fusion power can be successfully harnessed, we will no longer have to worry about energy shortages. Third, it will facilitate global collaboration. Successful fusion power generation requires the cooperation of scientists, engineers, and nations around the world. It promotes teamwork and cooperation on a global scale. By working together, we can share knowledge, resources, and expertise, and promote a sense of unity and understanding among different nations.

Finally, it promotes energy education and awareness. Fusion expands opportunities to learn about and understand energy and its impact on our lives. By understanding the importance of clean energy, children can develop environmentally friendly habits and grow up to contribute to a more sustainable future. Fusion power generation has the potential to revolutionize our energy landscape. It provides cleaner, nearly limitless energy, fosters global cooperation, fosters scientific curiosity, and encourages awareness of sustainable practices. By embracing fusion power, we can pave the way for a brighter, greener, more sustainable future for all.

Are you interested in nuclear fusion? Studying it has many benefits for us humans and our planet the Earth. I wish for the permanent peace of all humankind through the realization of nuclear fusion power generation.



This essay is made with the cooperation of Mark Vagins and Han Xiu. I would like to thank them for the pertinent comments on the draft and picture.