

Helical Fusion Unveils "GALOP"—A Groundbreaking Liquid Metal Blanket Testing System Essential for Commercial Fusion

Helical Fusion installs the world's first test system for pump-driven liquid metal blanket circulation and wall protection, key to commercial fusion power.

TOKI, GIFU, JAPAN, March 3, 2025 /EINPresswire.com/ -- Helical Fusion Co., Ltd. (Headquarters: Chuo-ku, Tokyo; Co-Founder, CEO: Takaya Taguchi) has successfully installed "GALOP" (GAs-driven Liquid metal OPeration), a proprietary test system designed to validate its liquid metal blanket technology, at its research facility located within the National Institute for Fusion Science (NIFS) in Toki City, Gifu Prefecture. The test system was developed in collaboration with Sukegawa Electric Co., Ltd.

(Headquarters: Takahagi City, Ibaraki; President: Mitsutoshi Takahashi), a company with over 70 years of expertise in thermal and measurement engineering.



"GALOP" A Liquid Metal Blanket Testing System Essential for Commercial Fusion Reactors

-The Significance of Fusion Energy

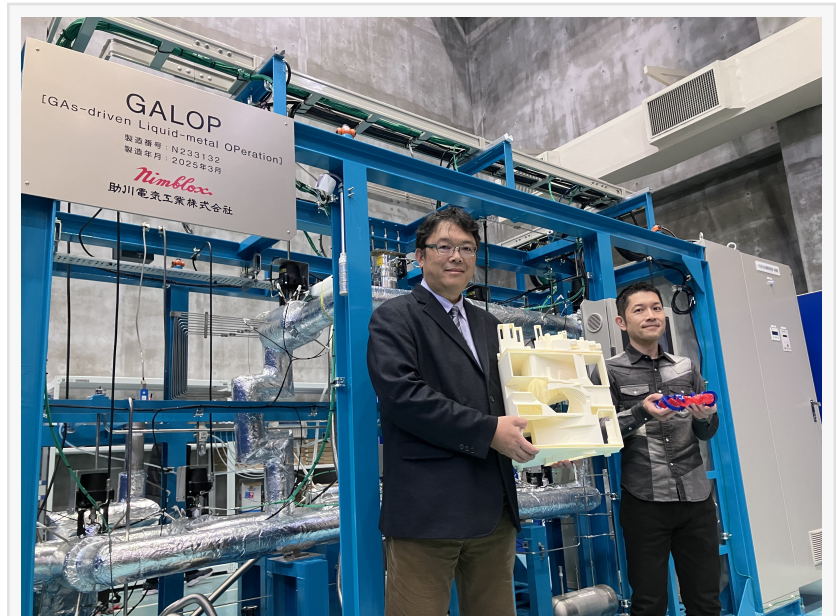
With the global population projected to grow by approximately 1.7 billion by 2050*, and the rising electricity demand driven by advancements like generative AI, existing energy sources alone will struggle to meet the world's needs. Fusion power, harnessing the same principles that power the sun, offers a clean, safe, and nearly limitless energy source derived from seawater, making it a crucial technology for addressing these global challenges.

The fusion plant construction and electricity market are expected to expand to an estimated \$550 billion annually by 2050**, positioning Japan to lead a new industrial revolution akin to its dominance in the automotive sector. However, international competition in fusion development is intensifying. Helical Fusion aims to develop the world's first steady-state fusion reactor by 2034

and commercialize fusion energy worldwide to establish a sustainable energy future.

-The Critical Role of Liquid Metal Blanket Development

Helical Fusion's "helical fusion reactor" is based on over 70 years of fusion research in Japan, particularly at NIFS, a world-leading institution. From plasma research to engineering, the reactor design has already overcome most technical hurdles for commercialization. One of the remaining challenges is the development of the blanket system—an essential component responsible for extracting energy, breeding fuel, and protecting the reactor's structure. Despite its importance, no fusion machine worldwide has yet successfully implemented this technology.



Helical Fusion Co-Founder, CTO Junichi Miyazawa (left), who designed "GALOP," and Vice CTO Takuya Goto (right).



Helical Fusion Logo

Helical Fusion's proprietary "liquid metal blanket," designed by Co-Founder and CTO Junichi Miyazawa, is a breakthrough concept that balances efficiency and component durability. With the GALOP, the company aims to validate a novel liquid metal pump mechanism, a key step toward realizing the world's first commercial fusion reactor.

*Source: International Energy Agency (IEA) – World Energy Outlook 2023

**Source: FusionX/Helixos – Global Fusion Market Analysis: Electricity, Supply Chain & Construction

-About "GALOP"

Dimensions: Approx. 4m (W) × 2m (D) × 2m (H)

Objectives:

1. Validate a new liquid metal circulation pump powered by pressurized gas, eliminating rotating components for improved corrosion resistance and high-temperature operation.
2. Demonstrate liquid metal protection for the first wall of the blanket.
3. Conduct long-duration steady-state liquid metal flow tests in a vacuum environment for material evaluation.

-About Sukegawa Electric

<https://sukegawadenki.co.jp/english/company/outline.html>

-Executive Comments

Takaya Taguchi, Co-Founder & CEO, Helical Fusion:

"Sukegawa Electric has been an invaluable partner, bringing decades of experience in energy-related engineering to support our mission. The success of this test will mark a major milestone toward bringing fusion energy to society. We are confident that together, we can realize the world's first commercial fusion reactor."

Junichi Miyazawa, Co-Founder & CTO, Helical Fusion:

"The liquid metal blanket is a groundbreaking technology that no one has yet implemented. Our GALOP system represents a bold step in applying gas-driven liquid metal circulation in fusion reactors. I deeply appreciate President Takahashi and the Sukegawa Electric team for their unwavering commitment to this challenge. This test is a crucial bridge between fusion research and practical reactor development."

naho yoshimura

Helical Fusion Co., Ltd.

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