

IN OPERATION THE MOST INNOVATIVE 11.74T MRI CORE MAGNET TO BE USED ON HUMANS

Brain images acquired with the 11.74T MRI are expected to be 10 times more detailed than those obtained from a standard 1.5T MRI.

The system is expected to provide researchers with ultra-high resolution contrast images of the brain, enabling the early diagnosis and treatment of neuro-degenerative brain diseases such as Parkinson's disease, Alzheimer's disease and stroke.

Researchers are aiming to operate the world's first simultaneous multi-channel/multi-nuclear 11.74T MRI system within this year.

17 November 2022, Genoa (ITALY). The world's first simultaneous multi-channel/multi-nuclear 11.74T MRI system is currently under development at Gachon University Gil Medical Center. In the first Half of 2022 Gachon University Gil Medical Center (GUGMC) successfully completed the Site Acceptance Test of the Magnet, which is a core part of the brain-specific ultra-precision 11.74T MRI that is being jointly developed with ASG Superconductors (ASG) in Italy.

GUGMC invited technical managers of ASG, an Italian leading superconducting company, and experts from Korea for performance evaluation of the 11.74T MRI Magnet, which has been under development at Gachon Brain Valley, located in Songdo Economic Free Zone, Incheon.

Now one of the most sophisticated magnets in the world is "in operation" and fully serviced by ASG technicians onsite.

At the same time the evaluation committee confirmed that the magnetic field reached the target field density while maintaining stability and uniformity. The Site Acceptance Test evaluated three main criteria: 1) the internal temperature of the 11.74T MRI magnet ($< 2.2\text{K}$ (Kelvin)), 2) the intensity of the magnetic field (11.74T at 2.2K) 3) the uniformity of the magnetic field.

The test satisfied these three criteria allowing the project to proceed to the next step. In particular, it was a significant success as the evaluation was conducted at the actual site of Gachon Brain Valley Brain Disease Center where the magnet installation and field ramp-up were carried out, not in a laboratory environment.

The researchers at GUGMC are aiming to operate the world's first simultaneous multi-channel/multi-nuclear 11.74T MRI system before the end of this year/next spring by combining the 11.74T magnet with gradient magnetic coils, RF coils, electronic equipment, power supplies, etc.

Brain images acquired with the 11.74T MRI are expected to be almost 10 times more detailed than those obtained from a standard 1.5T MRI, providing researchers with ultra-high-resolution images of the brain structures for the early diagnosis and treatment of neuro-degenerative brain diseases such as Parkinson's disease, Alzheimer's disease and stroke, etc.

Professor Woo-Kyung KIM, President of Gachon University Gil Medical Center (President of the Neuroscience Research Institute) said, *"The ultra-high resolution brain images obtained from the 11.74T MRI system are expected to provide significant clues for the early diagnosis and treatment of neuro-degenerative brain diseases such as Parkinson's disease, Alzheimer's and stroke, etc. This 11.74T project (Principal Investigator: Prof. Jun-Young CHUNG) is supported by a grant of the Korea Health Technology R&D Project through the Korea Health Industry Development Institute (KHIDI), funded by the Ministry for Health and Welfare, Korea."*

Superconducting technologies and magnets are finding more application areas in the medical sector. ASG designs and builds magnets for MRI applications with magnetic field intensities ranging from fractions of one tesla up to Ultra High Field (UHF) levels. Capitalizing on skills and experience derived from research and industrial collaboration, ASG is constantly improving its competences and is completely equipped to design and build new types of magnets for medical diagnostics and therapies. ASG develops also other UHF MRI magnets for other leading medical and research sites addressing MRI research, and other magnet systems for medical diagnostics and therapies, like hadron therapy.

Stefano Pittaluga Sales Manager UHF and MRI of ASG Superconductors said, *"This is another important milestone for our superconducting technology track record in a very challenging and exclusive sector like Ultra High Field MRI magnets development. Furthermore, we're very proud to collaborate with such a prestigious institute as GUGMC and we're confident that in the coming years relevant improvements in healthcare will be achieved thanks to this very sophisticated MRI technology system magnet based on our cutting edge 11.74T magnet and GUGMC's scientific work"*

GUGMC PROFILE

GUGMC is a medical foundation established in 1958, through the generosity of Dr Lee Gil Ya. Over the years it has become one of Asia's most important medical centers and a leading development center for magnetic resonance and radiology technology.

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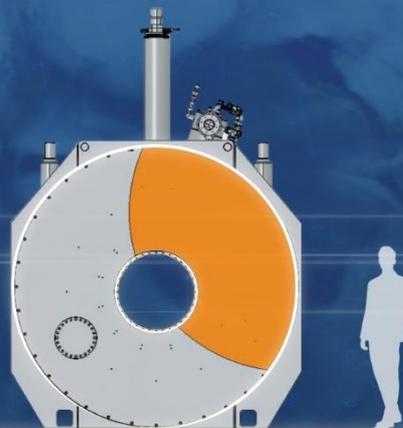
ASG Superconductors SpA (Genoa, Italy) is a worldwide leading superconducting magnet company with more than 60 years of experience and relevant worldwide projects in fusion energy, high energy physics, MRI, MedTech and proton therapy systems.

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the most innovative
11.74T MRI Core Magnet
to be used on humans for research



Superior healthcare and prevention
with innovative MRI: all this will be based
on the evolution of **superconducting materials**