ASG SUPERCONDUCTORS

COMPANY PROFILE
HEALTHCARE

www.asgsuperconductors.com

ASG SUPERCONDUCTORS

LEADING /SUPERCONDUCTING/ TECHNOLOGY

We improve everyday life creating real value for the world of research, energy, med-tech and industry by developing superconducting magnets, wires, cables and innovative systems.

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ASG SUPERCONDUCTORS

FROM RESEARCH TO EVERYDAY LIFE

For 75 years, ASG Superconductors has been at the forefront of superconductive technology. From magnets that enabled the discovery of the Higgs Boson to record-setting superconducting wires for energy transmission, we have contributed to the world's largest international research projects.

As society moves toward electrification and sustainability, superconductivity is becoming increasingly viable for cost-effective industrial and everyday applications, thanks to advances in materials and expertise.

Our magnetic systems and superconducting cables-including our advanced high-temperature superconductor MgB_2 - are designed and manufactured in Italy, leveraging robust physical, engineering, and manufacturing know-how. With a team of 200 highly specialized employees and subsidiaries in Italy, France, the USA, and the UK, ASG Superconductors is a global leader in superconductive technology.

ASG SUPERCONDUCTORS

BIG SCIENCE

SUPERCONDUCTING MAGNETIC SYSTEMS
SUPERCONDUCTING CYCLOTRONS
SUPERCONDUCTING MULTIPOLAR MAGNETS
SUPERCONDUCTING SOLENOIDS
SERVICE

"Big Science" refers to large-scale scientific research projects that require collaboration among many researchers and international institutions. These projects, such as those at CERN, Fermilab, GSI, JINR, and INFN, address fundamental scientific questions and rely on advanced technologies and interdisciplinary approaches.

ASG Superconductors has partnered with these institutions, providing a range of magnetic systems-from quadrupoles to cyclotrons and detectors-designed and built in-house. Our unique expertise, commitment to total quality, and close synergy between engineering and production have turned these collaborations into success stories.

We are ready to tackle future research challenges that demand even more sophisticated and energy-efficient magnetic systems.

FUSION ENERGY

TOROIDAL FIELD COILS FOR TOKAMAK
POLOIDAL FIELD COILS FOR TOKAMAK
NON-PLANAR COILS FOR STELLARATORS
COMPLEMENTARY MAGNETIC SYSTEMS
SUPERCONDUCTING CABLES FOR ZERO-LOSSES ENERGY TRANSMISSION
CONSULTANCY
SERVICE

The dream of replicating the energy of the sun and stars on Earth through fusion power plants is rapidly becoming a reality. More than a century after the discovery of superconductivity, advances in materials and knowledge from major international experiments are paving the way for fusion power plants to be connected to the electrical grid by around 2040.

ASG Superconductors has developed the magnetic core for the world's most important fusion research projects, including Tore Supra, JET, ITER, JT-60SA, DTT (Divertor Tokamak Test), and Wendelstein W7-X. We offer engineering, manufacturing, and technical support for the realization of core components for fusion reactors based on both tokamaks and stellarators.

INDUSTRY AND ENERGY

SUPERCONDUCTING CABLES
SUPERCONDUCTING STORAGE SYSTEMS
SUPERCONDUCTING FAULT CURRENT LIMITERS
MAGNETIC SYSTEMS
SERVICE

As global energy demand increases, efficient, low-loss cables are essential. Superconductivity offers a tangible, cost-effective solution for green energy generation, transmission, and storage. Our MgB_2 superconducting cables are already operational at CERN and are being tested in European projects such as V-ACCESS, Scarlet, Best Paths, and Cablegnosis.

We are also developing Europe's most powerful superconducting cable (1 GW capacity) in Italy with INFN. MgB_2 technology is ideal for nuclear plants, solar systems, trans-European links, energy-intensive industries, and compact high-energy applications. It offers a footprint reduction factor of 10 or more compared to conventional solutions and is fully compatible with liquid hydrogen temperatures.

ASG SUPERCONDUCTORS

MEDICAL SYSTEMS STRATEGIC BUSINESS UNIT

Leading superconducting technology in healthcare sector

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ASG SUPERCONDUCTORS

DRY MAGNET TECHNOLOGY

CRYOGEN FREE MAGNETS BASED ON MGB_2 AND NbTi
MRI SYSTEM MAGNETS
THERAPY CYCLOTRON MAGNETS
MRGRT MAGNETS
ROTATING MAGNETS
SERVICE

HEALTHCARE

Since 2004, ASG has been at the forefront of designing and constructing cryo-free magnets tailored for medical applications. These efforts have been driven both by internal investment and strategic collaborations with customers, reflecting a long-standing commitment to innovation.

At the heart of these systems is conduction cooling technology, allowing magnets to operate efficiently at temperatures between 4.5 and 20 Kelvin—without the need for liquid cryogens.

Building on years of experience, ASG has extended its role into the energy sector, where cryo-free magnets are not just beneficial—they are a necessary condition for widespread adoption.

From MRI diagnostics to proton therapy, and emerging MR-guided treatments, ASG is the partner of choice for developing and manufacturing high-performance, cryo-free magnet systems.

HEALTHCARE

ASG has developed and is now commercializing MROpen, the world's **only open-sky, upright, cryogen-free MRI system**. The system is based on **proprietary MgB_2 superconducting wire and magnet technology**.

Its unique geometry supports upright imaging, dynamic MR, and applications in sports medicine, enabling scans that reflect real-life posture and motion.

MROpen can be integrated into a smart network of hospitals, imaging centers, and physicians, designed to serve patients with specific needs—such as athletes, elderly individuals, people with disabilities, those with claustrophobia, and others requiring tailored imaging conditions.

Currently, more than 25 MROpen units are installed worldwide, including 9 in the United States. The system is in use at centers of excellence and leading imaging chains in both Europe and the U.S.

University of Alberta · Alberta Health Services · InHealth · Centre for Hip Health and Mobility · US Radiology Specialists · Alliance Medical · affidea · The University of Nottingham

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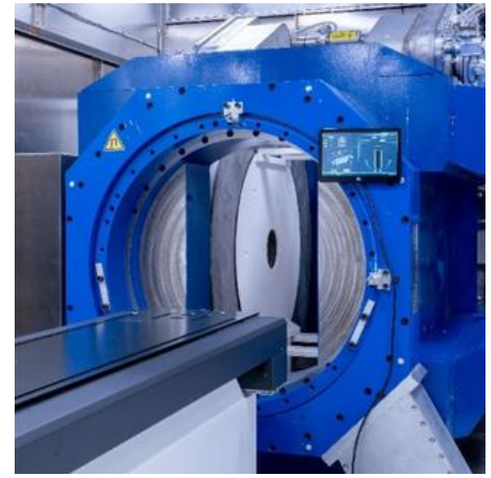
DRY ROTATING MAGNETIC SYSTEM FOR THERAPY MRI GUIDANCE

MR Open Evo unique magnet characteristics allow for operation while rotating around the patient isocentre in order to deliver **real-time MR image guided radio and particle therapy.**

Research institutions in Canada and Germany are currently validating treatment protocols for this machine.



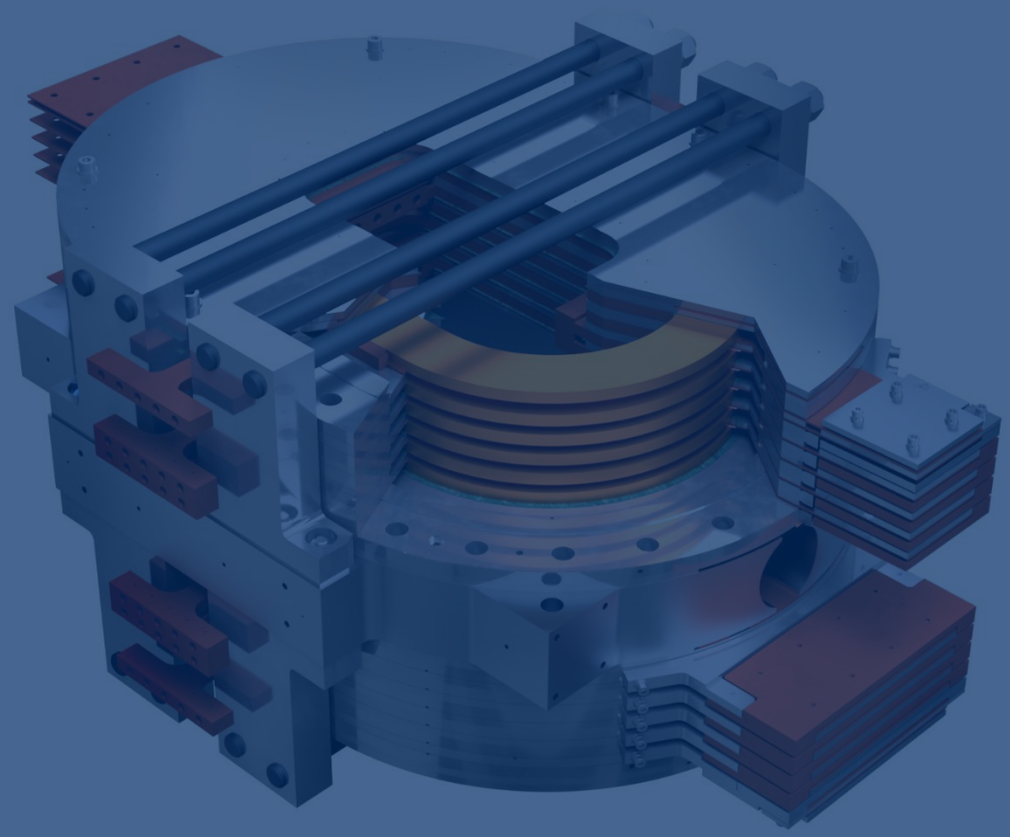
DRY MAGNETS FOR HADRON THERAPY

ASG is a long-term supplier of compact superconducting-cryogen free magnets for IBA's **compact synchro-cyclotron for hadron therapy**.
These magnets are based on **NbTi dry magnet technology**.

Particle therapy is used to treat many types of cancer, particularly in situations where normal treatments and radiotherapy are too risky for patients, including tumours of the central nervous system, eye, spine, prostate, liver, breasts and in childhood.

ASG SUPERCONDUCTORS

HIGH TEMPERATURE SUPERCONDUCTORS: DRY 10T DIPOLE MAGNETS



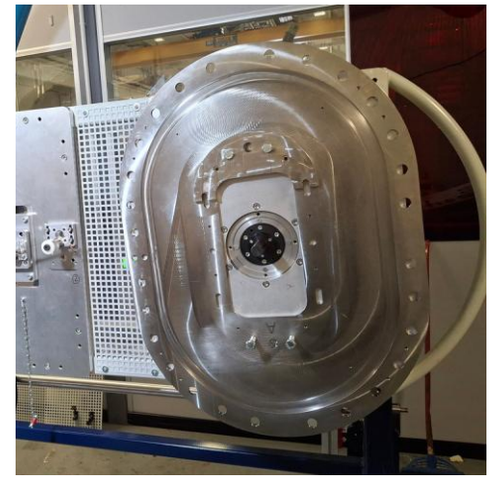
ASG IS ACTIVE IN HTS TECHNOLOGY WITH POSSIBLE APPLICATIONS TO MRI AND NMR

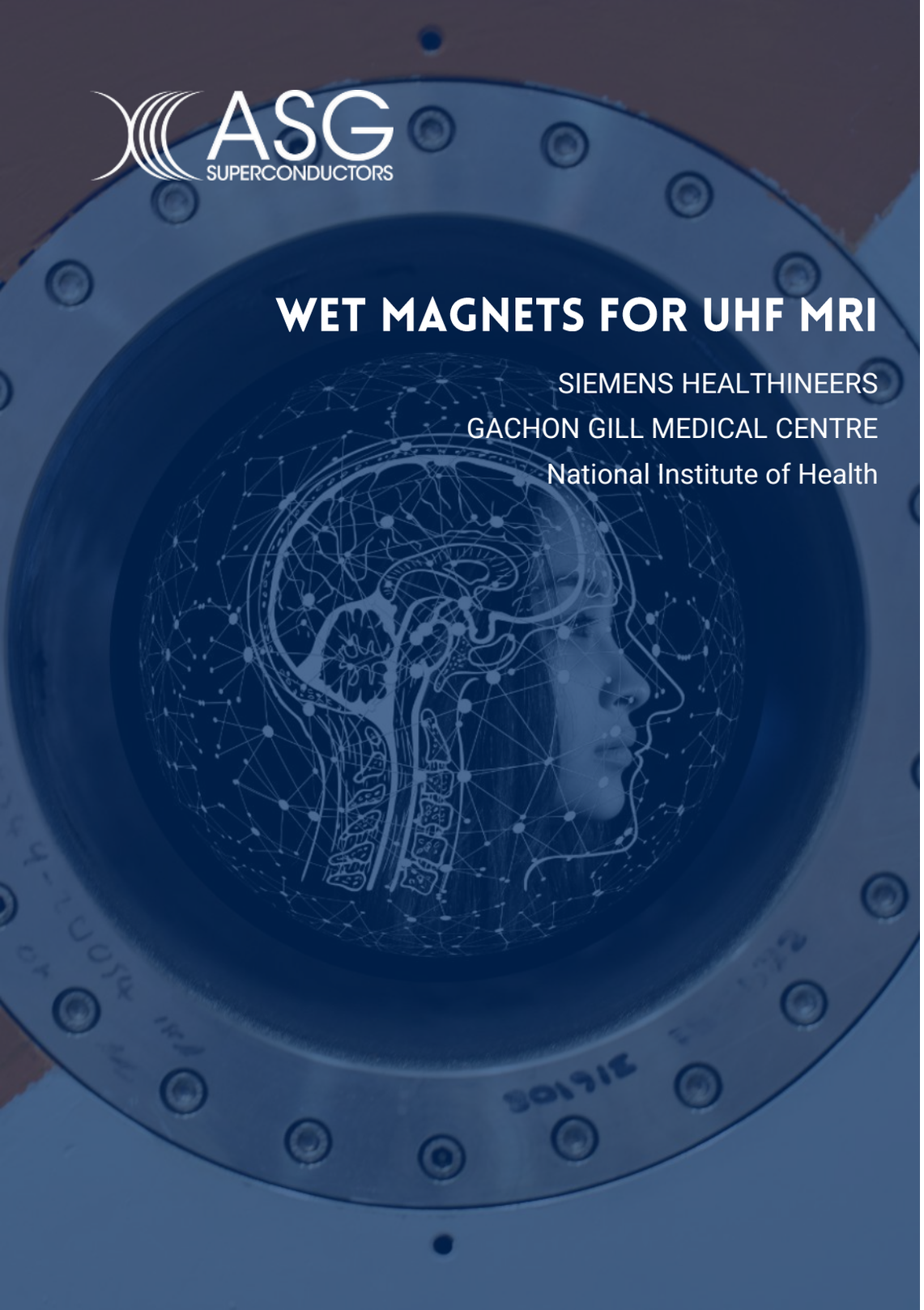
ASG has designed in close collaboration with INFN and is currently manufacturing a 10T ReBCO magnet intended for a cable test facility with an eye on acceleration grade magnets.

Cryocooled, metal insulated, dynamic power dissipation control.

The R&D project focused on developing high-field dipoles for INFN, based on HTS non-insulated technology, is ongoing:

- The electrical, thermal, mechanical, protection, and manufacturing issues encountered, although related to accelerator magnets, are **applicable to the MRI and NMR sectors**





WET MAGNETS FOR UHF MRI

SIEMENS HEALTHINEERS
GACHON GILL MEDICAL CENTRE
National Institute of Health

For **UHF human MRI** (above 7 Tesla), wet magnets using liquid helium are still essential, as cryogen-free systems cannot yet provide the thermal stability and cooling power required to maintain superconductivity at such field strengths.

ASG is at the forefront of innovation in this domain, with a strong track record in designing and constructing:

- **Sub-cooled magnets** (11.74 T magnets for GUGMC and NIH)
- **Zero boil-off magnets** (7 T magnet pototype for head imaging)
- **Pre-clinical magnets** (17 T magnet for NIH)

Thanks to this proven expertise, ASG is a **strategic partner of Siemens Healthineers** in the supply of UHF MRI systems and is currently collaborating on a 10.6 T MRI system for the Chinese Academy of Sciences.

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