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What's New in the World of Superconductivity (September)

Power

Nexans (September 10, 2003)

In an integrated project sponsored by the German Federal Department of Education and Science (BMBF), a 1.2 MVA fault current limiter (FCL) was successfully demonstrated at FGH (Research Association for High Voltage Technologies) in Mannheim, Germany, and at FZK (Research Center) in Karlsruhe, Germany. The FCL's superconducting components were designed and built by Nexans. The FCL was tested using short circuit currents of up to 18,000 A and an artificial lightning impulse of 75,000 V. Nexans is now developing a 10 MVA demonstrator for 10 kV networks that should be completed by the end of the year. The demonstrator will be tested under field conditions by the German energy operator RWE.

Source:
"Nexans designs the most powerful component for Superconducting Current Limiters worldwide"
Nexans press release (September 10, 2003)
http://www.nexans.com/dyn/site.php3?page_id=18

American Superconductor Corporation (September 10, 2003)

American Superconductor Corporation (AMSC) announced that it has been selected by CERN to provide 14,000 m of HTS wire for the current lead devices that will be used in the construction of the Large Hadron Collider (LHC), a 17-mile long high-energy particle accelerator. The wire will be delivered to CERN over the next two fiscal quarters. Commented Dr. Amalia Ballarino, Lead Scientist in charge of current leads for the LHC, "The high quality of AMSC's wire and their experience with challenging HTS applications will help ensure the reliability and performance of the thousands of superconductor magnets that form the heart of the LHC." The current leads that CERN will fabricate using AMSC's wire will range in rating from 600 to 13,000 A.

Source:
"American Superconductor Technology to Help CERN Explore the Mysteries of Matter"
American Superconductor Corporation press release (September 10, 2003)
http://www.amsuper.com/html/newsEvents/news/106783295804.html

Trithor and Synflex (September 16, 2003)

Trithor, a leading manufacturer of HTS wires, and Synflex, a leading supplier of magnet wires and insulating materials in Europe, have announced their intention to cooperate in opening up the HTS technology market in Europe. Trithor will transfer know-how on HTS wires and their application to Synflex, while Synflex will share its European marketing and logistic network, customers, and experience with Trithor (at present, Synflex distributes more than 6000 standard items to more than 4000 customers). Within the scope of the agreement, Synflex will cooperate closely with Trithor in offering a product range of HTS wires to the European market.

Source:
"Synflex and Trithor Jointly Developing the European Motor, Generator, and Transformer Market for Superconductor Technology"

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Trithor press release (September 16, 2003)
http://www.trithor.com/?13

American Superconductor Corporation (September 18 and 22, 2003)

American Superconductor Corporation has announced that its D-VAR® (Dynamic Volt-Ampere-Reactive) transmission grid reliability system will be used by Mendota Hills, LLC, the developer of a wind farm near Chicago. The system will provide reactive power support and voltage regulation, enabling the wind farm to meet the standards required for interconnection to Commonwealth Edison's electrical power grid in Illinois. The system will include a 4 MegaVAR (MVAR) D-VAR system and two capacitor banks controlled by the D-VAR system. The wind farm is expected to generate about 40 MW of electric power, enough to supply more than 12,500 homes. Global wind power generation is expected to grow by more than 640% from 31,000 MW in 2002 to 230,000 MW in 2010 (according to the European Wind Energy Association).

In a second press release, AMSC also announced that a D-VAR system would be used to provide critical voltage support to the electric power grid for the Orkney Islands, in Scotland. Scottish and Southern Energy (SSE), the local grid owner and operator, awarded the contract to AMSC and their UK-based construction partners, Kelvin Construction Company. Commented Mike Barlow, System Manager for SSE, "American Superconductor analyzed our grid system and provided a solution tailored to our needs . . . Installing the D-VAR system will enable us to better protect our grid from voltage fluctuations and safely increase the amount of electric power supplied to the grid by the Orkney wind farms as they develop over the next years." The D-VAR system will protect the islands' power supply from critical contingency events, such the loss of one of the two 33 kV underwater power cables that serves the islands, and stabilize the power grid, which is susceptible to voltage swings caused by the Orkney wind farms. The Orkney power grid presently has a load capacity of 32 MW and serves more than 10,000 customers. The wind farms presently produce 25 MW of electricity, supplying power to the Orkney Islands and the Scottish mainland. However, SSE expects developers to expand the number of wind farms to provide and additional 15 MW of electrical power during 2004.
Source:
"American Superconductor D-VAR® System to Ensure Transmission of Reliable Power for Illinois Wind Farm"
American Superconductor Corporation press release (September 18, 2003)
http://www.amsuper.com/html/newsEvents/news/106783296908.html
"American Superconductor D-VAR® Solution to Ensure Reliable Electric Power for Scotland's Orkney Islands"
American Superconductor Corporation press release (September 22, 2003)
http://www.amsuper.com/html/newsEvents/news/SSE_092203.html

Earth Institute at Columbia University (September 23, 2003)

Researchers at Columbia University have assembled a team of specialists to develop a "Smart Electric Grid" – an efficient electrical delivery system capable of meeting the future energy and security demands of the United States. At present, a little less than 15 Terawatt-hours (TWh) per year of electricity are consumed in the US; this figure is expected to increase two- to three-fold to about 30 TWh per year by 2050. In addition to meeting this massive increase in the demand for electricity, future grid systems must also be able to accommodate solar and wind farms and be invulnerable to security

breaches, attacks, natural disasters, and mechanical failures. The team of researchers has developed a framework for such a “Smart Electric Grid,” which they intend to test in Texas and the Northeast. Commented Dr. Roger N. Anderson of the Lamont-Doherty Earth Observatory, “We plan to integrate new technologies with the public policies, economic incentives and regulation changes that will be required to produce the new electric power system. The plan calls for a National Test Bed to put designs and innovations to practical use. A smarter and more capable system is essential to the future of economic growth and vitality for all of North America, and we intend to build the demonstration projects that will show the way to the future grid.”

Source:

“Smart electric grid of the future is in development”

Earth Institute at Columbia University press release (September 23, 2003)

http://www.earth.columbia.edu/news/2003/story09-23-03.html

Intermagnetics General Corporation (September 23, 2003)

Intermagnetics General Corporation reported their first-quarter financial results, which reflected a planned temporary reduction in MRI magnet deliveries during the quarter. Net income for the quarter ending August 24, 2003, amounted to US $262,000, compared with $3.7 million for the same period in the previous year. Net sales amounted to $22.3 million, compared with $35.2 million for the same period in the previous year. The reduction in MRI magnet deliveries was the result of a new magnet supply agreement with Philips Medical Systems, the largest customer of Intermagnetics. In this agreement, which is expected to lead to incremental product sales opportunities, Intermagnetics assumed a larger share of the supply-chain management responsibilities, necessitating the temporary reduction in first-quarter production and scheduled shipments. Net sales in the Instrumentation segment increased by 27% from the same period last year to $5.8 million, while MRI sales for the quarter amounted to $14.4 million, compared to $30.3 million for the same period last year. Both of these segments reported an operating profit. The Energy Technology segment, SuperPower, Inc., reported a substantial increase in revenues from recently announced federal funding commitments. The Department of Energy will provide nearly $20 million in funding to a SuperPower-led project for the development of efficient and reliable means of delivering electricity.

Source:

“Intermagnetics Reports First-Quarter Operating Results”

Intermagnetics General Corporation press release (September 23, 2003)

http://www.igc.com/news_events/news_story.asp?id=95

American Superconductor Corporation (September 25, 2003)

American Superconductor Corporation (AMSC) has received a funding award from the Oak Ridge National Laboratory as part of the U.S. Department of Energy’s Superconductivity Program in the Office of Electric Transmission & Distribution. The award will be used to support the development of the advanced manufacturing processes and enhanced electrical performances required for the commercialization of second-generation HTS wires. The award, which is part of a cost-sharing program, will be incrementally funded up to US $ 2.5 million over the next three years. Commented Jimmy Glotfelty, Director of the U.S. Department of Energy’s Office of Electric Transmission & Distribution, “ . . . we believe that high temperature superconductor technologies are poised to play a very important role in our nation's 21st century power grid. This development program will help ensure

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that the first generation HTS grid projects underway today will be followed by robust second generation HTS technologies in the years ahead." AMSC intends to use the funding to extend their present manufacturing process by increasing the in-process width of the strips from 1 to 4 cm and to extend the length up to 100 meters. The 4-cm-wide strips will then be slit lengthwise to form eight 4-mm wide wires, the industry standard dimension for HTS wire. This manufacturing technique, known as “wide-web coating”, allows multiple wires to be produced with only a marginal increase in cost and is essential to the commercial production of second-generation wires.
Source:
“American Superconductor Awarded Funding by Oak Ridge National Laboratory to Optimize Low Cost, High Volume Manufacturing of Future Superconductor Wire”
American Superconductor Corporation press release (September 25, 2003)
http://www.amsuper.com/html/newsEvents/news/106783296916.html

Magnet

Oxford Instruments (September 9, 2003)

On August 23, 2003, researchers from Oxford Instruments, Superconducting Technology, and Florida State University set multiple world performance records for superconducting magnets in a technology demonstration. A coil wound from BSCCO-2212 tape and inserted into the bore of a 20 Tesla resistive magnet produced a central field of 25.04 Tesla. This is the first time that a superconducting magnet has reached the 25 Tesla benchmark. In addition, the 5 Tesla net field added by the superconducting section exceeded the previous record for ceramic superconducting magnets of a useful size. The coil was wound from approximately 2 km of a 5 mm x 2 mm multi-filamentary BSCCO-2212 tape manufactured by Oxford Instruments. Unlike BSCCO-2223 and YBCO tapes, which have superior performances at high temperatures, BSCCO-2212 tape remains the performance leader at high fields and low-temperatures. The coil itself was assembled and tested by the National High Magnetic Field Laboratory. The clear inner bore is 38 mm in diameter, which is a commercially practical size.
Source:
“Researchers Set New World Records for a Superconducting Magnet”
Oxford Instruments press release (September 9, 2003)
http://www.oxford-instruments.com/OSTNWP703.htm

Oxford Instruments (September 19, 2003)

Oxford Instruments Superconductivity has delivered an 8 Tesla class, 1.1-m bore superconducting outsert magnet to the Grenoble High Magnetic Field Laboratory (GHMFL). Once integrated with a 32 T resistive magnet insert, developed at the GHMFL, the system will be capable of generating a magnetic field of 40 T, making it the second strongest continuous field magnet system in the world. The magnet will be used to study the behavior of organic and inorganic materials and to investigate the fundamental laws of nature. Oxford Instruments faced considerable technical challenges in the construction of the superconducting magnet, which required a 1.1-m cold-bore to accommodate the resistive magnet and must be capable of withstanding mechanical forces in excess of 700 tonnes in case the resistive magnet develops a fault.
Source:

"A world first in magnet design"
Oxford Instruments press release (September 19, 2003)
http://www.oxford-instruments.com/SCNNWP706.htm

Cryocooler

Oxford Instruments (September 11, 2003)

Physicists at the Royal Institute of Technology in Stockholm are using Oxford Instrument's KelvinoxAST dilution refrigerators to create the low temperatures required to manipulate single Cooper pairs in superconducting circuits. The researchers are measuring small capacitance Josephson junction circuits using a measurement system that enables them to exercise quantum control over the circuit. The results of this research are expected to be of use in the creation of new electrical standards and quantum devices. The KelvinoxAST utilizes sorption-pumping technology to eliminate the need for the 3He/4He mixture to be circulated by room-temperature pumping systems, creating significant benefits for the user. The refrigeration system is fully automated, enabling the physicists to spend more time working on their experiments.
Source:
"KelvinoxAST creates the right environment for quantum physics"
Oxford Instruments press release (September 11, 2003)
http://www.oxford-instruments.com/SCNNWP704.htm

Communication

Superconductor Technologies Inc. (September 9, 2003)

Superconductor Technologies Inc. (STI) announced that Carolina West Wireless (a repeat customer) will begin installing STI's SuperLink ™ Rx cryogenic receiver front-ends and HTS-Ready ™ Duplexers in all of its 56 existing base stations in western North Carolina. The deployment is part of the company's planned CDMA overlay that began this fall. By using STI's SuperLink products, Carolina West will be able to set up an antenna-sharing configuration for CDMA technology without having to install any new antennas. Carolina West also intends to install SuperLink Solutions in its new base stations that are planned or under construction. This is the first time that a wireless carrier has integrated STI's overlay products over an entire existing network. The cost of the order was not disclosed.
Source:
"Carolina West Wireless to Deploy SuperLink(TM) Solutions by Superconductor Technologies Enabling CDMA Overlay and Network Upgrade"
Superconductor Technologies Inc. press release (September 9, 2003)
http://ir.thomsonfn.com/InvestorRelations/PubNewsStory.aspx?partner=5951&storyId=93819

ISCO International, Inc. (September 19, 2003)

ISCO International, Inc. has released a new RF(2) ™ product line; the RF(2) is a reverse-link low noise front-end solution based on ISCO's experience with radio frequency and wireless base station performance needs. The RF(2) is designed for network-wide deployment and functions to improve the coverage integrity of base stations and eliminate dead zones, resulting in a reduction in

the number of failed connection attempts and dropped calls. The product line competes with other front-end products, including HTS solutions, but does so at a fraction of the cost. Ongoing fields trials indicate a network improvement that is nearly equal to that of the much more expensive HTS solutions. The RF(2) is also smaller and lighter than HTS filters. Commented Dr. Amr Abdelmonem, CEO of ISCO, "The cost per decibel (db) of improvement, combined with the ease in installation and lack of maintenance, put the RF(2) in a class by itself.

These advantages, coupled with a lack of cryogenic cooler or other moving parts, serve to make the RF(2) highly competitive with other reverse-link enhancement products such as HTS."

Source:

"ISCO International Announces Launch of RF(2) Product Line"

ISCO International, Inc. press release (September 19, 2003)

http://www.iscointl.com/

ISCO International (September 23, 2003)

ISCO International has filed an appeal in its patent litigation against Superconductor Technologies, Inc (STI). The initial jury determination was overturned by the Court on August 21, 2003, denying STI's request for damages and attorney fees. However, the jury determination of patent invalidity and unenforceability based on inequitable conduct was not overturned. ISCO International maintains that the patent was properly issued and is enforceable.

Source:

"ISCO International Announces Appeal Filing in Patent Litigation against Superconductor Technologies, Inc."

ISCO International press release (September 23, 2003)

http://www.iscointl.com/

Superconductor Technologies Inc. (September 26, 2003)

Superconductor Technologies Inc. (STI) has filed a cross-appeal to recover damages amounting to US $3.8 million that were previously awarded by a jury verdict in the patent infringement lawsuit filed by ISCO International, Inc. STI is also asking that its legal fees associated with the case be reimbursed. In August, the Court rejected ISCO's request to overturn the jury's verdict that the patent was invalid and agreed that the patent was unenforceable because of inequitable conduct. However, the court overturned the jury's verdict of unfair competition and bad faith on the part of ISCO and removed the related compensatory damages and reimbursement for legal fees. STI is appealing this portion of the Court's decision. STI strongly believes that the jury's ruling will be upheld through the appeal process.

Source:

"Superconductor Technologies Inc. Files Cross-appeal in '215 Patent Infringement Lawsuit"

Superconductor Technologies Inc. press release (September 26, 2003)

http://ir.thomsonfn.com/InvestorRelations/PubNewsStory.aspx?partner=5951&storyId=95159

(Akihiko Tsutai, Director, International Affairs Department, ISTEC)

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