

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

Power

American Superconductor Corporation and GE Energy (September 8, 2004)

American Superconductor Corporation and GE Energy, a business of the General Electric Company, announced an order for two D-VAR transmission grid reliability systems from International Transmission Company (ITC), the first fully independent, for-profit transmission business in the U.S. The two D-VAR units will be installed in a 120 kilovolt transmission system in East Central Michigan and will be used to mitigate voltage disturbances and prevent electrical faults or outages in the power network from causing voltage collapse, thereby acting as a countermeasure for blackouts. Each installation, which will be made at separate substations, will consist of an integrated transmission reliability solution including capacitors and transformers (provided by GE Energy) and an 8 MVA D-VAR system. Each D-VAR system is capable of providing up to three times its continuous rating for a maximum of 24 MVA -an important feature for network voltage stabilization. The two systems are expected to be operational in the spring and fall of 2005.

Source:

"American Superconductor and GE Energy Announce Order for Two Transmission Grid Reliability Systems from International Transmission Company"

American Superconductor Corporation press release (September 8, 2004)

http://phx.corporate-ir.net/phoenix.zhtml?c=86422&p=irol-newsArticle_Print&ID=611143&highlight

U.S. Department of Energy and the Los Alamos National Laboratory (September 9, 2004)

Researchers at the Los Alamos National Laboratory have demonstrated a simple and industrially scaleable method for improving the current density of coated conductors in magnetic fields. The method could potentially increase the current carrying capacity of superconducting wires and tapes by as much as 200 -500% in applications like motors and generators, where reductions in current density in the presence of high magnetic fields have been limiting. The method involves the simultaneous deposition of barium zirconate and YBCO, resulting in the embedding of nanoscale particles (with a diameter of 50 -100 atoms) of barium zirconate in the superconductor film. As a result, the current density of coated conductors in a high magnetic field at the temperature of liquid nitrogen was increased 2 -5 times. The new process, which can be easily and economically incorporated into conventional commercial processing methods for superconductors, will be valuable for the development of superconducting motors and generators for civilian and military applications. Dean Peterson, leader of the Los Alamos Superconductivity Technology Center, commented, "This is a significant technical advancement because it means we are now beginning to understand how to control defects in these superconducting materials and use them to our advantage. This was the first time we have been able to control the structural defects and in doing so, better engineer the material's structure to optimize performance." The research, conducted under the auspices of the Los Alamos Superconductivity Technology Center and funded by the Department of Energy's Office of Electric Transmission and Distribution, was reported in the journal Nature Materials.

Source:

“Nanotechnology leads to discovery of super superconductors”

Los Alamos National Laboratory press release (September 9, 2004)

<http://www.lanl.gov/worldview/news/releases/archive/04-075.shtml>

Intermagnetics General Corporation (September 22, 2004)

Intermagnetics General Corporation (IMGC) reported their financial results for their first fiscal quarter, ending August 29, 2004. Net income increased to U.S. \$ 5.7 million, excluding acquisition-related expenses and the non-cash effects of the scheduled vesting of performance-based stock compensation charges and the recovery of charges from a prior divestiture. The reported net income was \$ 5.3 million, compared to \$262,000 for the same period in the previous fiscal year. Net sales increased to \$59.7 million, compared to \$22.3 million for the same period in the previous fiscal year. The Instrumentation segment of IMGC performed particularly well, with a nearly 42% increase sales and operating profits more than four times the value for the previous fiscal year. The integration of acquired business Invivo has been essentially completed, while that of MRID is proceeding according to plan. Invivo contributed \$18.6 million in revenue, while MRID contributed about \$5 million in revenue during its first six weeks as part of IMGC. The Energy Technology segment achieved significant technical and prototype device milestones with a revenue of \$1.5 million and an overall investment of \$2.1 million for the quarter; both of these figures are in line with anticipated levels. The company had an operating cash flow of nearly \$5.9 million for the quarter, and long-term debt now stands at \$ 94.3 million. The company's strengthening cash flow status is enabling an aggressive debt-reduction policy.

Source:

“Intermagnetics Reports Q1 Net Income of \$5.3 Million”

Intermagnetics General Corporation press release (September 22, 2004)

<http://ir.thomsonfn.com/InvestorRelations/PubNewsStory.aspx?partner=10215&storyId=120653>

SuperPower (September 22, 2004)

SuperPower, a subsidiary of Intermagnetics General Corporation, reported that the U.S. Department of Energy's Annual Peer Review has ranked SuperPower's second-generation (2G) HTS wire program as one of two HTS wire programs that tied for the number one position in the country. Included in SuperPower's report were 1) the world record achievement of 7,000 amp-meters in a 100-meter 2G HTS wire, 2) the enhancement of facilities enabling the routine production of 100-meter lengths of 2G wire, 3) the demonstration of critical currents of 380 amperes in a short sample and up to 250 amperes in 1-meter lengths of 2G wire, 4) the fabrication of four electrical coils using about 25 meters of 2G HTS wire and delivery to Rockwell Automation for integration in a small demonstration HTS generator, 5) linear speeds of greater than 10 meters/hour for all processing steps, 6) the first shipment of 2G HTS wire to Sumitomo Electric Industries for use in the Albany HTS Cable Project, and 7) several other important technical achievements. The peer reviewers commented on the company's strong teamwork and focus as well as the need for additional support from the Department of Energy in fiscal 2005.

Source:

“Intermagnetics' SuperPower Subsidiary Reports Repeat of No. 1 Ranking for 2nd Generation

HTS Wire Program at 2004 DOE Peer Review”

Intermagetics General Corporation press release (September 22, 2004)

http://www.igc.com/news_events/news_story.asp?id=136

SuperPower (September 24, 2004)

SuperPower, a subsidiary of Intermagetics General Corporation, reported that the U.S. Department of Energy’s Annual Peer Review has ranked SuperPower’s MFCL program as the second best SPI HTS device program (out of nine) in the country. SuperPower presented its proof-of-concept testing results for a pre-prototype device at the review. The main objective of the testing was to demonstrate the current limiting performance of the MFCL, also known as a “power valve”. The pre-prototype rapidly reacted to a power surge and started to limit the increase in short circuit current within about 4 milliseconds. In addition, the device was also capable of limiting the current by as much as 50% in about 50 milliseconds, which is the time at which conventional circuit breakers start to operate. This significant limitation of the fault current at the third cycle allows the circuit breakers to safely interrupt the fault current, enabling utilities to defer or eliminate expensive multiple circuit breaker upgrades when changes to the system result in a significant increase in fault current levels. The testing, which was completed at KEMA Power Test, was conducted at short circuit current levels of up to 27,000 amperes. The peer reviewers noted that the pre-prototype MFCL, with ratings of 8.6 kV line to ground, 800 Arms nominal current, and the ability to significantly limit fault currents up to 25 kA peak, was effectively demonstrated and agreed that fault current reduction was clearly demonstrated at all these levels, indicating that the concept could be applied at distribution voltage levels. The resulting level of technological understanding and strong teamwork (with Nexans, KEMA Power Test, and, recently, Oak Ridge National Laboratory) were deemed especially noteworthy. The Peer Reviewers were also pleased with the “Technical Advisory Board”, consisting of a number of utility members and the Electric Power Research Institute. The purpose of the advisory board is to keep the project specifications on track and to increase awareness of the new device within the utility community. Philip J. Pellegrino, President of SuperPower added, “We ... are already hard at work moving forward to achieve our next milestone: designing, building and testing the alpha prototype device which will be designed to withstand transmission level voltage requirements. Completion of this second project phase is scheduled for late 2005. A commercial stage unit is expected to be available in 2007.”

Source:

“Intermagetics’ SuperPower Subsidiary Receives No. 2 Ranking Among DOE’s SPI Device Programs for HTS Matrix Fault Current Limiter (MFCL) Development Project at 2004 DOE Peer Review”

Intermagetics General Corporation press release (September 24, 2004)

http://www.igc.com/news_events/news_story.asp?id=137

American Superconductor Corporation (September 27, 2004)

American Superconductor Corporation announced the successful full-load demonstration of its prototype 5-megawatt HTS ship propulsion motor under steady state operational conditions at the Center for Advanced Power Systems (CAPS) at Florida State University. Developed under contract with the U.S. Navy’s Office of Naval Research (ONR), the

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motor is expected to prove the viability of HTS technology for both military and commercial marine propulsion systems. After the testing at CAPS is completed, the motor will undergo additional performance testing at the Naval Surface Warfare Center in Philadelphia. The Navy will then decide the need for additional land-based and at-sea testing. The 5-MW motor is a smaller version of the 36.5-MW motor currently being built by American Superconductor and Northrop Grumman under a U.S. \$ 70 million three-year contract from the ONR.

Source:

“American Superconductor Announces Successful Full Load Operation of 5-Megawatt Ship Propulsion Motor at U.S. Navy’s Center for Advanced Power Systems”

American Superconductor Corporation press release (September 27, 2004)

http://phx.corporate-ir.net/phoenix.zhtml?c=86422&p=irol-newsArticle_Print&ID=618756&highlight

Trithor GmbH (September 28, 2004)

Trithor GmbH announced a new program for the development of second-generation (2G) high-temperature superconductors. The 3-year program, valued at 1.3 million euros, will be funded by the German Federal Ministry of Education and Research (BMBF) and will supplement an existing program funded by the European Union Framework 6. While the EU program focused on the development of the necessary process elements for 2G HTS conductors, the new program will focus on the development of advanced conductor architectures and deposition processes. The new wire is expected to contribute to a more viable and larger market share for HTS products from 2010 onwards. Dr. Frank Sicking, Scientific Officer of the BMBF grant-controlling agency VDI Technologiezentrum, commented, “In a thorough selection process we have chosen Trithor to take the lead for the manufacturing of long length coated conductors based on chemical deposition, because of its unique combination of technical competence and entrepreneurial force. We want to turn the existing know-how base into products that succeed in the world markets.” Also involved in the program are the Leibniz Institute for Solid State and Materials Research Division (production of superconductor layers), RWTH Aachen, (development of innovative buffer layers), and ThyssenKrupp VDM GmbH (textured substrate). The program is expected to culminate in the construction of a pilot production plant for wire lengths of up to 250 meters. Since cost reduction is one of the major goals of the project, all manufacturing approaches will be based on chemical deposition technologies.

Source:

“Trithor Develops Manufacturing Technology for Long Length of Next Generation Superconductors”

Trithor GmbH press release (September 28, 2004)

http://www.trithor.de/pdf/2004-09-28Trithor2G_BMBF_ENG.pdf

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