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

Power

American Superconductor Corporation (December 20, 2005)

American Superconductor Corporation (AMSC) has announced that China's Institute of Electrical Engineering (IEE) has successfully demonstrated a 10.5-kV superconductor-based fault current limiter for the first time in a Chinese power grid. The device was fabricated by the IEE in collaboration with the Technical Institute of Physics and Chemistry and the Hunan Electric Power Company using AMSC's HTS wire. Since August 2005, the IEE fault current limiter device has successfully suppressed large spikes of current that were more than five times the normal levels. After six months of use, the device will be removed from service to undergo an internal examination of its components. The device will then be improved, if needed, and returned to operation in the power grid. Greg Yurek, chief executive of AMSC, stated, "This demonstration project is a critical step on the path to commercial sales of superconductor fault current limiters in China -- a market that we believe will be very large." The U.S. Department of Energy estimates that the market for superconductor fault current limiters in the U.S. alone will be several billion dollars over the next 15 years. "We expect the market in China to be even larger because grids there are already approaching the limits of circuit breakers in their rapidly expanding cities," said Yurek.

Source:

"Superconductor Fault Current Limiter Successfully Demonstrated for First Time in China Power Grid"

American Superconductor Corporation press release (December 20, 2005)

http://phx.corporate-ir.net/phoenix.zhtml?c=86422&p=irol-newsArticle_Print&ID=797676&highlight

Medeical

CardioMag Imaging, Inc. (December 14, 2005)

CardioMag Imaging, Inc. has announced that its common stock will be traded on the AIM Market of the London Stock Exchange. In connection with its AIM admission, CardioMag raised approximately US $9.3 million gross proceeds. The Company will use these proceeds, after expenses, for working capital, including the expansion of their international marketing efforts and U.S. manufacturing capabilities. The market capitalization of the Company based on the issue price in the placing was approximately $50.9 million. CardioMag designs, manufactures, and sells non-invasive magnetocardiograph systems.

Source:

"CardioMag Confirms Trading on London's Stock Exchange AIM Market"

CardioMag press release (December 14, 2005)

http://www.cardiomag.com/about/news/CMI_US_Placing_Release_12-14-05.pdf

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Communication

ISCO International (December 22, 2005)

ISCO International has provided an update on its fourth-quarter business operations. For the first time ever, the company has shipped US $10 million in annual revenue. Final results will not be available until early January 2006. In addition, the company has acquired a new customer that has allocated a significant amount of its 2006 business to ISCO International; this account promises to be an important new source of revenue for ISCO in 2006. ISCO International is also in ongoing discussions with a large PCS operator; based on the excellent results of a PCS commercial trial, this customer has asked ISCO to engineer another solution targeted at a systematic issue they have had with another area of their network.
Source:
“ISCO INTERNATIONAL PROVIDES UPDATE FOR THE FOURTH QUARTER 2005”
ISCO International press release (December 22, 2005)
http://www.iscointl.com/

Basic

Rice University (December 22, 2005)

Researchers at Rice University have succeeded in creating and observing a superfluid of fermions that consisted of a cluster of mismatched pairs of spin-up and spin-down fermions surrounded by a cloud of potential partners. At temperatures a few billionths of a degree above absolute zero, fermions with equal but opposite spin are attracted to one another and begin to move in unison. In superconductors, this pairing of fermions enables current to flow without any resistance. Conventional theory states that superconductivity only occurs in the presence of an equal number of spin-up and spin-down particles, and physicists have speculated for numerous years about what would happen if this condition were not met. The Rice researchers cooled a mixture of fermionic lithium-6 atoms to about 30-billionths of a degree above absolute zero and then used radio waves to alter the ratio of spin-up and spin-down atoms. They discovered that the superfluid was able to withstand an excess of up to 10% of unpaired fermions with no detrimental effects. Unexpectedly, the gas behaved as if it were perfectly paired, despite an excess of spin-up atoms. Increasing the ratio of spin-up to spin-down atoms eventually caused a phase change; when the number of unpaired spin-up atoms increased above 10% of the total sample, the unpaired loners were suddenly expelled leaving a core of superfluid pairs surrounded by a shell of excess spin-up atoms. The research, which provides insights into both superconductivity and superfluidity, will be published in a future issue of Science and was supported by the National Science Foundation, the Office of Naval Research, NASA, and the R.A. Welch Foundation.
Source:
“Ultracold test produces long-sought quantum mix”
Rice University press release (December 22, 2005)
http://www.media.rice.edu/media/NewsBot.asp?MODE=VIEW&ID=8101&SnID=327289313

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

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