

What's New in the World of Superconductivity (January, 2012)

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Power cable

Helmholtz Association of German Research Centres (January 19, 2012)

The Helmholtz Association of German Research Centres has announced the start of the "AmpaCity" project, in which The RWE Group and its partners will replace a 1-km-long high-voltage cable connecting two transformer stations in Essen, Germany, with a state-of-the-art superconductor solution. Once installed, the cable will be the longest superconductor cable installation in the world. As part of the project, the Karlsruhe Institute of Technology is analyzing suitable superconducting and insulating materials. Nexans will produce the three-phase, concentric 10-kV cable, which will be designed for a transmission capacity of 40 MW. The installation will also be the first to combine a superconducting cable with a resistive superconducting fault current limiter for overload protection. The superconducting fault current limiter will also be manufactured by Nexans. Upon completion of a two-year field test, if successful, the installation of 10-kV superconducting links in large sections of the backbone of the Essen distribution network could become feasible. Such installations would lead to greater efficiency as well as lower operating and maintenance costs while simultaneously reducing land use. The AmpaCity project is being supported by the energy research department of the Federal Ministry of Economics and Technology (BMWi).

Source: "World's longest superconductor cable"
Helmholtz Association of German Research Centres press release (January 13, 2012)

HTS wire

Superconductor Technologies Inc. (January 10, 2012)

On January 1, 2012, Superconductor Technologies Inc. (STI) took possession of its new Austin Advanced Manufacturing Center of Excellence (AMCE) facility. The new building is now being prepared for the installation of HTS wire manufacturing equipment, which will occur during the first quarter of 2012. Jeff Quiram, STI's president and chief executive officer, commented, "The opening of our AMCE facility in Austin is an important milestone for STI that places us on track to achieve commercial availability of HTS wire in 2013. This new facility positions us to meet the growing expectations of our prospective HTS wire customers by significantly increasing our production capacity. While we did not consummate a commercial agreement last year as we had expected, we are actively pursuing a number of exciting commercial HTS wire opportunities. STI is committed to working closely with the industry leaders in HTS devices by providing meaningful quantities of our Conductus® 2G HTS wire." STI is also in the process of relocating its corporate headquarters to Austin. Until then, it will continue to maintain a presence in Santa Barbara, CA.

Source: "Superconductor Technologies Inc. Takes Possession of Advanced Manufacturing Center of Excellence in Austin, TX"

Superconductor Technologies Inc. press release (January 10, 2012)

Superconductor Technologies Inc. (January 17, 2012)

Superconductor Technologies Inc. (STI) has announced that General Cable Superconductors Ltd. (GCS) has completed the testing of STI's second-generation HTS wire. GCS, an HTS Roebel cable provider located in New Zealand, has now tested the wire and has confirmed that STI's wire meets their critical current power objective. Jeff Quiram, STI's president and chief executive officer, commented, "General Cable Superconductors' validation again shows that our Conductus® 2G HTS wire development is progressing to meet the demand of innovative power applications like Roebel cable, which offers very high current carrying capacity for future superconducting applications like motors, generators and transformers. GCS technology provides a promising path to open new market opportunities for 2G HTS wire."

Source: "Superconductor Technologies Inc. Completes Testing of Conductus® 2G HTS Wire with General Cable Superconductor Ltd. for HTS Roebel Cable Applications"

Superconductor Technologies Inc. press release (January 17, 2012)

Superconductor Technologies Inc. (January 19, 2012)

Superconductor Technologies Inc. (STI) has agreed to supply its Conductus® second-generation HTS wire to a leading HTS power transmission cable provider for use in a superconducting high power transmission cable demonstration project. The project is scheduled to be completed by the end of 2012. Jeff Quiram, STI's president and chief executive officer, commented, "We are pleased to have been selected for this project and look forward to demonstrating the best in class performance of our Conductus wire. We recently produced a wire sample that maintains a critical current of greater than 500 A per cm-width at a temperature of 77 K. Importantly, we achieved this critical current measurement on 2- μ m thick HTS film, an industry objective associated with the economic production of 2G HTS wire. This technical accomplishment combined with the expected wire production capacity from our new facility in Austin enabled us to commit a quantity of wire to this prospective customer. STI's high performance Conductus wire met the technical requirements and expected supply availability to participate in our prospective customer's demonstration project. Both parties expect that once this project is successfully completed, a new industry benchmark for HTS power transmission cable performance will have been established."

Source: "Demonstration project scheduled to be completed by end of 2012"

Superconductor Technologies Inc. press release (January 19, 2012)

Superconducting fault current limiter (SFCL)

Nexans and Helmholtz Association of German Research Centres (January 13, 2012)

Nexans has successfully commissioned the world's first resistive superconducting fault current limiter (SFCL) based on second-generation YBCO superconductor tapes. The SFCL was developed in cooperation with the Karlsruhe Institute of Technology and has been installed on behalf of Vattenfall Europe Generation AG. The SFCL is being used to provide short-circuit protection for the internal medium voltage

power supply of a coal mill and crusher in the Boxberg power plant, located in Saxony, Germany. Replacing a first-generation SFCL based on solid superconducting materials, the new SFCL device further reduces the already low losses in the conductor material by an additional 90 %, thereby reducing operating costs. The new SFCL is also able to respond to short circuits more quickly than the first-generation device. The new SFCL is designed for a nominal current of 560 A at 12,000 V, but the device can allow brief currents of up to 2,500 A without triggering a response. This characteristic is important for the operation of coal mills, enabling a high current to be drawn upon start-up without causing any problems. Once a response has been triggered, the limiter automatically returns to a normal state of operation within a few seconds, without the destruction of any of the components; this feature results in a much shorter power failure, compared with conventional devices. Now that the installation has been completed, a field test at the utility will be performed; the results of this field test are expected to be highly relevant, as this current limitation functionality could be integrated in superconducting transformers and energy cables in the future.

Source: "Nexans goes live on grid with world's first fault current limiter based on second-generation superconductors"

Nexans press release (January 13, 2012)

and,

"Superconducting current limiter guarantees electricity supply of the Boxberg power plant"

Helmholtz Association of German Research Centres press release (January 13, 2012)

Big contract

Bruker Energy & Supercon Technologies (January 5, 2012)

Bruker Energy & Supercon Technologies (BEST) has received a large order for low-temperature superconductors (LTS) from an Asian manufacturer of magnetic resonance imaging (MRI) magnets in addition to a third large, multi-year LTS contract from a major clinical MRI manufacturer. The two contracts will add more than \$40 million in minimum order commitments. These contracts are in addition to the \$71 million in minimum purchase commitments from two other leading MRI manufacturers announced in November 2011. Revenue from these contracts should be realized in 2012, 2013, and 2014. Actual purchases made during these three-year contracts may be as much as 25 % higher than the minimum commitment levels.

Source: "Bruker Energy & Supercon Technologies (BEST) Announces New Large Asian Order and Third Multi-Year Superconductor Contract from MRI Manufacturer"

Bruker Energy & Supercon Technologies press release (January 5, 2012)

Energy transport

Columbus Superconductors (December 15, 2011)

A joint team of Russian researchers has developed and tested a prototype for a hybrid hydrogen and superconducting energy transport system. The system consists of a 12-m hydrogen transfer cryostat and current leads with a rated current of up to 3 – 4 kA. The power cable was developed using MgB₂

superconducting wire manufactured by Columbus Superconductor. The prototype represents the first experimental demonstration of the feasibility of a high-power energy transport system for the transfer of both liquid hydrogen and electricity.

Source: "First in the World Prototype of Hydrogen Superconducting Transport System Has Been Tested"
Columbus Superconductors press release (December 15, 2012)

<http://ewh.ieee.org/tc/csc/europe/newsforum/highlightsHP43%20.html>

Weightless experiment

University of Nottingham (January 4, 2012)

Researchers at The University of Nottingham have used powerful superconducting magnets (16 T) to levitate fruit flies as part of studies investigating how weightless conditions in space affect biological organisms. Simulating weightlessness in fruit flies using magnets on the Earth's surface causes the flies to walk more quickly, which is the exact same effect as that observed during similar experiments performed on the International Space Station. Using diamagnetic levitation on Earth is expected to be useful for determining which experiments would be suitable and interesting to perform in space prior to spending the money required for a space launch. The group's work was published in the latest edition of the Royal Society journal *Interface*.

Source: "Magnetically-levitated flies offer clues to future of life in space"

University of Nottingham press release (January 4, 2012)

<http://www.nottingham.ac.uk/news/pressreleases/2012/january/magnetically-levitated-flies-offer-clues-to-future-of-life-in-space.aspx>



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