

# Superconductivity Web21

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## What's New in the World of Superconductivity

(Jan., 2016)

초전도 뉴스 -세계의 동향-

超电导新闻 -世界的动向-

chāo diàn dǎo xīnwén - shìjiè de dòngxiàng-

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★News sources and related areas in this issue

### ►Power Applications

#### Funding for Resilient Grid System

AMSC (3 November, 2015)

AMSC has been awarded a contract modification worth up to \$3.7 million from the U.S. Department of Homeland Security (DHS) Science and Technology (S&T) Directorate, which now totals \$5.2 million. This project forms part of the work of the S&T Directorate at DHS to secure the nation's electric power grids and

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improve resiliency against extreme weather, acts of terrorism, or other catastrophic events. AMSC's Resilient Electric Grid system offers resiliency in the event that parts of the grid go down for any number of reasons. AMSC and ComEd are working towards a deployment plan to permanently install this system in downtown Chicago. This funding will allow AMSC start to purchase and qualify key subcomponents of the system and undertake important engineering tasks to ensure optimal system performance. The phase of the program under the contract modification is expected to end in May 2017.

Source: "AMSC Resilient Electric Grid System Program Moves Forward With New Funding Authorization" (3 Nov, 2015) Press Releases

<http://ir.amsc.com/releases.cfm>

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## ►Maglev

### US Maglev Train

#### **Federal Railroad Administration (6 November, 2015)**

The Federal Railroad Administration (FRA) awarded a \$27.8 million grant to the State of Maryland for preconstruction and planning costs for the potential development of a magnetic levitation (maglev) train between Washington, DC and Baltimore, Md. The funding specifically applies to preconstruction planning, engineering analysis, and other capital costs for fixed guideway infrastructure.

Maglev trains in Japan typically realize speeds in excess of 300mph, but have also been tested at speeds approaching 400mph. The FRA will assess the practicality of this maglev project to meet high safety standards as well as assessing the potential of this technology for future transportation.

For more information, please see the 2015 Notice of Funding Availability: <https://www.fra.dot.gov/eLib/Details/L16260>.

Source: "FRA Awards \$27.8 Million to the State of Maryland for Baltimore-DC Magnetic Levitation Railroad" (6 Nov, 2015) Press Releases

[https://www.fra.dot.gov/eLib/details/L17207#p1\\_z10\\_gD\\_IPR](https://www.fra.dot.gov/eLib/details/L17207#p1_z10_gD_IPR)

Contact: [frapa@dot.gov](mailto:frapa@dot.gov)

## ►Wire

### Supply of HTS Wires

#### **Superconductor Technologies Inc (10 November, 2015)**

Superconductor Technologies Inc. (STI) reported results for the quarter ended Sept. 26, 2015. Jeff Quiram,

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STI's president and chief executive officer, stated that shipments of Conductus® wire increased this quarter and the forecasted demand for projects in 2016 and beyond far exceeds their existing manufacturing capacity. The company remains focused of supplying wires for superconducting fault current limiters (SFCL), magnets and power transmission cables.

With successful partnership with the Robinson Research Institute, STI has shipped wires to two new magnet customers - one during the third quarter and one in October. STI expanded their market reach by entering a distribution agreement with TING Corporation to supply the India market with Conductus wire. Since 2013, TING has sold 2G HTS wire to the Indian market for multiple customers and applications.

Source: "Reports 2015 Third Quarter Results"

(10 Nov, 2015) News

<http://phx.corporate-ir.net/phoenix.zhtml?c=70847&p=irol-newsArticle&ID=211085>

Contact: Investor Relations Contact, Cathy Mattison [invest@supotech.com](mailto:invest@supotech.com)

## ►Basics

### High $T_c$ FeSe film

#### Tohoku University (4 November, 2015)

Researchers at Tohoku University's Institute for Materials Research (IMR) has realized layer-by-layer etching in superconducting FeSe films down to approximately one-monolayer about 0.6nm. As the thickness of the film is reduced, the superconducting transition temperature ( $T_c$ ) increases to around 40 K. In addition, the research group reveals that by combining with an electrostatic charging effect, the high- $T_c$  transition can be induced in 10-nm thick condition (20 monolayers), which has currently been limited in one/two-monolayers. The development of this etching technique will allow for the exploration of nontrivial physical phenomena in atomically thin two-dimensional films. Their research outcome was published in Nature Physics online on Nov 2, 2015.

Source: "Electrochemical etching down to one-monolayer towards high- $T_c$  superconductivity"

(4 Nov, 2015) News

<http://www.tohoku.ac.jp/en/news/research/news20151104.html>

Contact: Junichi Shiogai, [junichi.shiogai@imr.tohoku.ac.jp](mailto:junichi.shiogai@imr.tohoku.ac.jp)

### High $H_{c2}$ MoS<sub>2</sub>

#### Radboud University (12 November, 2015)

Experiments conducted at the High Field Magnet Laboratory (HFML) in Nijmegen and jointly operated by Radboud University and the FOM foundation, have discovered that transistors fabricated from MoS<sub>2</sub> are not only superconducting at low temperatures but also stay superconducting in a high magnetic field, measured up to 37 Tesla.

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Electron pairing in conventional superconductors is easily broken when exposed to magnetic fields, but in MoS<sub>2</sub> the paired electrons are intrinsically associated with an internal high magnetic field which can reach nearly one hundred Tesla and is much higher than the 37.5 Tesla measured at HFML, behaving in a way that contradicts a law in physics, the so called Pauli paramagnetic limit. Their findings are published in *Science*, November 12.

Source: "Superconductor survives ultra high magnetic field"

(12 Nov, 2015) News

<http://www.ru.nl/english/news-agenda/vm/physics/2015/superconductor-magnet/>

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[Top of Superconductivity Web21](#)