



Status of 2G HTS Wire Production at SuperOx

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SuperOx, Moscow, Russia

Outline

SuperOx

- About SuperOx
- 2G HTS wire characteristics
- New customization options for 2G HTS wire
- Development for applications at SuperOx

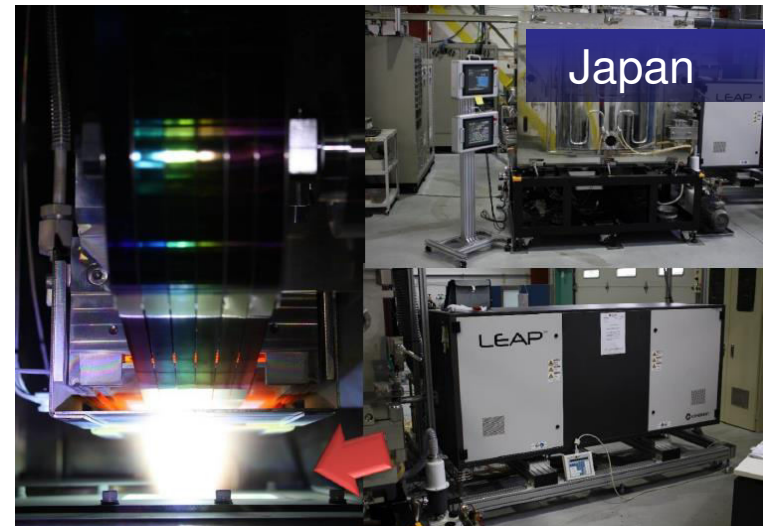
SuperOx



- SuperOx company founded in November 2006 in Moscow
- 2011: SuperOx Japan LLC founded in Tokyo
- 2012: starts production of 2G HTS wire in Russia and Japan
- 2014 : delivers 2G HTS to customers in 10 countries worldwide



Russia



Japan

SuperOx (Moscow)



- production of 2G HTS wire
- development of process equipment
- R&D
- quality control
- development of HTS equipment
- market development

850 m² / staff - 25

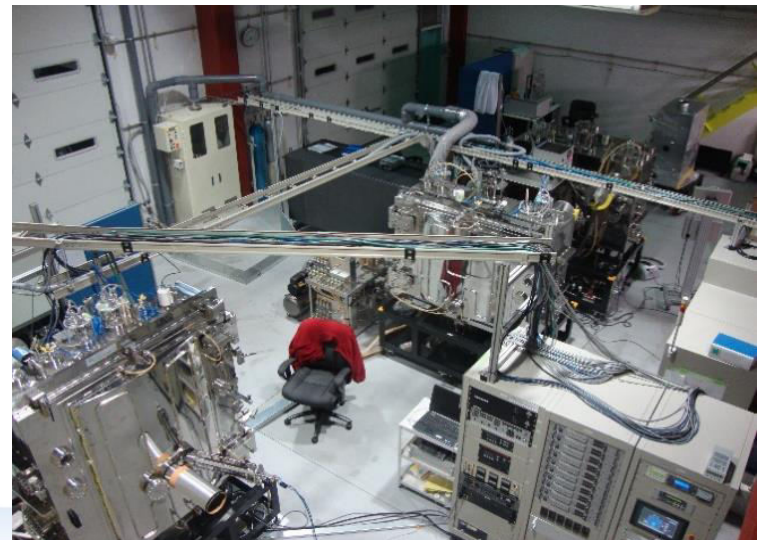


SuperOx Japan LLC



- production of 2G HTS wire
- quality control
- R&D
- market development

220 m² / staff - 5



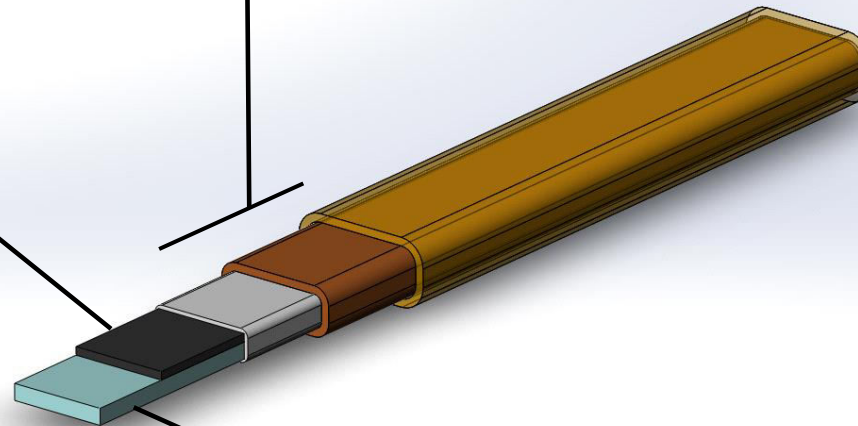
Structure of 2G HTS Wire

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Customization
(silver/copper/solder/lamination/isolation)

HTS layer



Substrate

- polishing or planarisation
- buffer layers

Plans to develop Production in Moscow

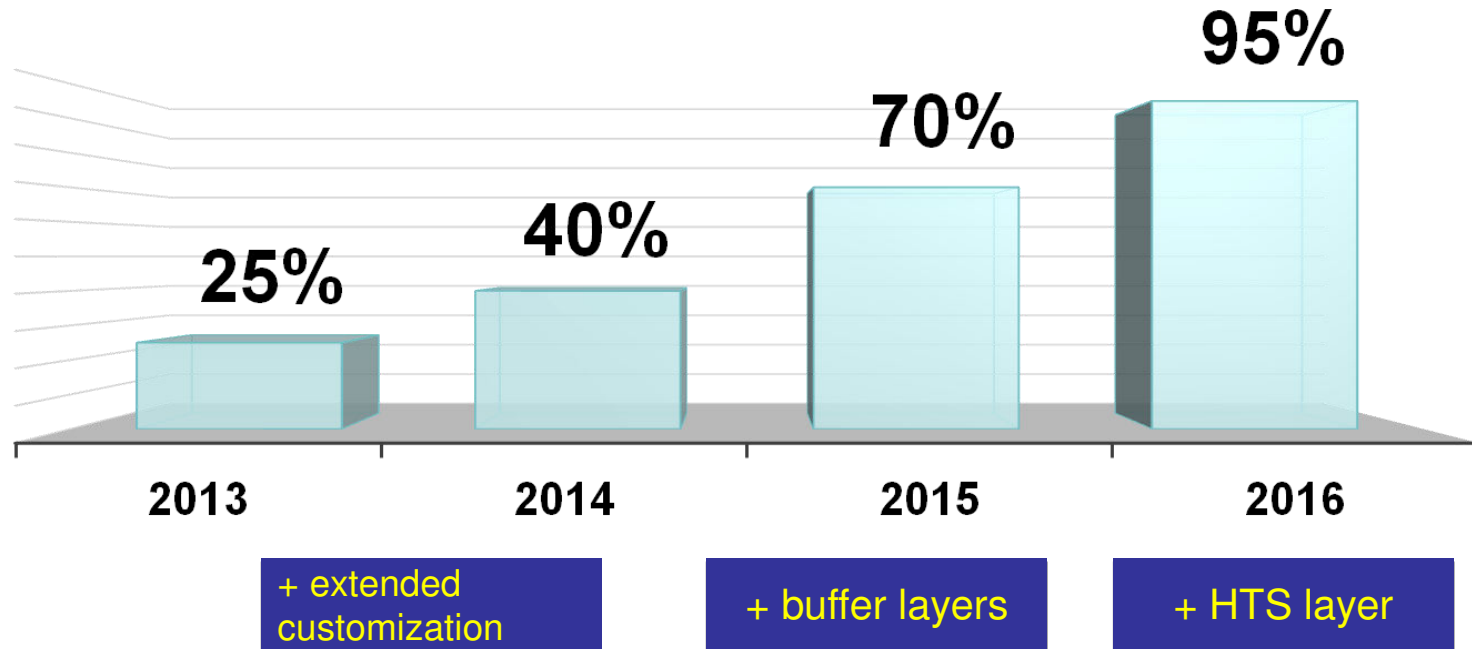
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| Stage | 2014 | 2015 | 2016 |
|---------------|------------------|------------------|----------------|
| Substrate | outsource | outsource | outsource |
| Polishing | SuperOx | SuperOx | SuperOx |
| Buffer layers | SuperOx Japan | SuperOx | SuperOx |
| HTS | SuperOx Japan | SuperOx Japan | SuperOx |
| Customization | SuperOx | SuperOx | SuperOx |

Production Localization in Russia

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SuperOx plans to retain production units both in Japan and Russia

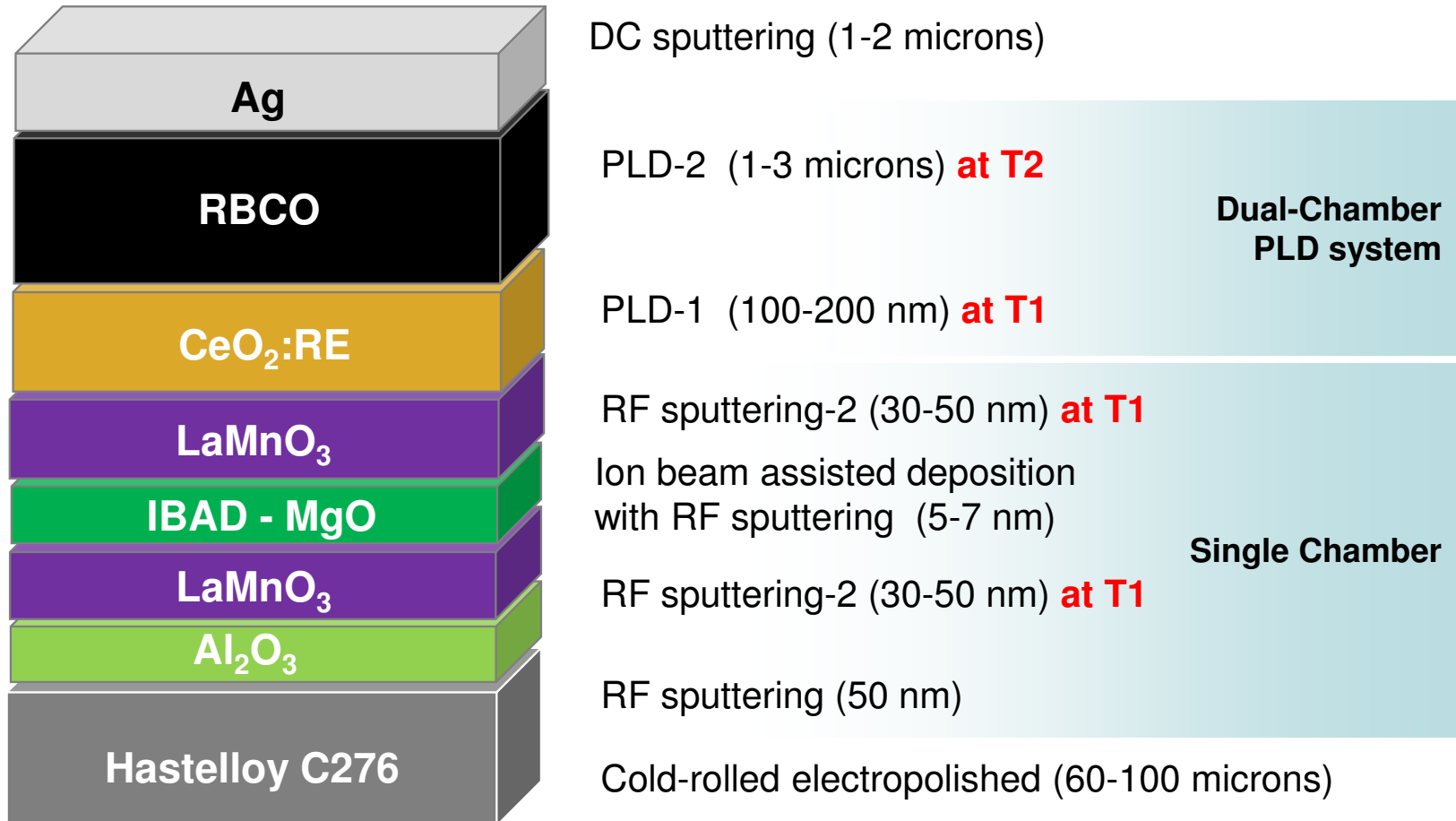
Outline



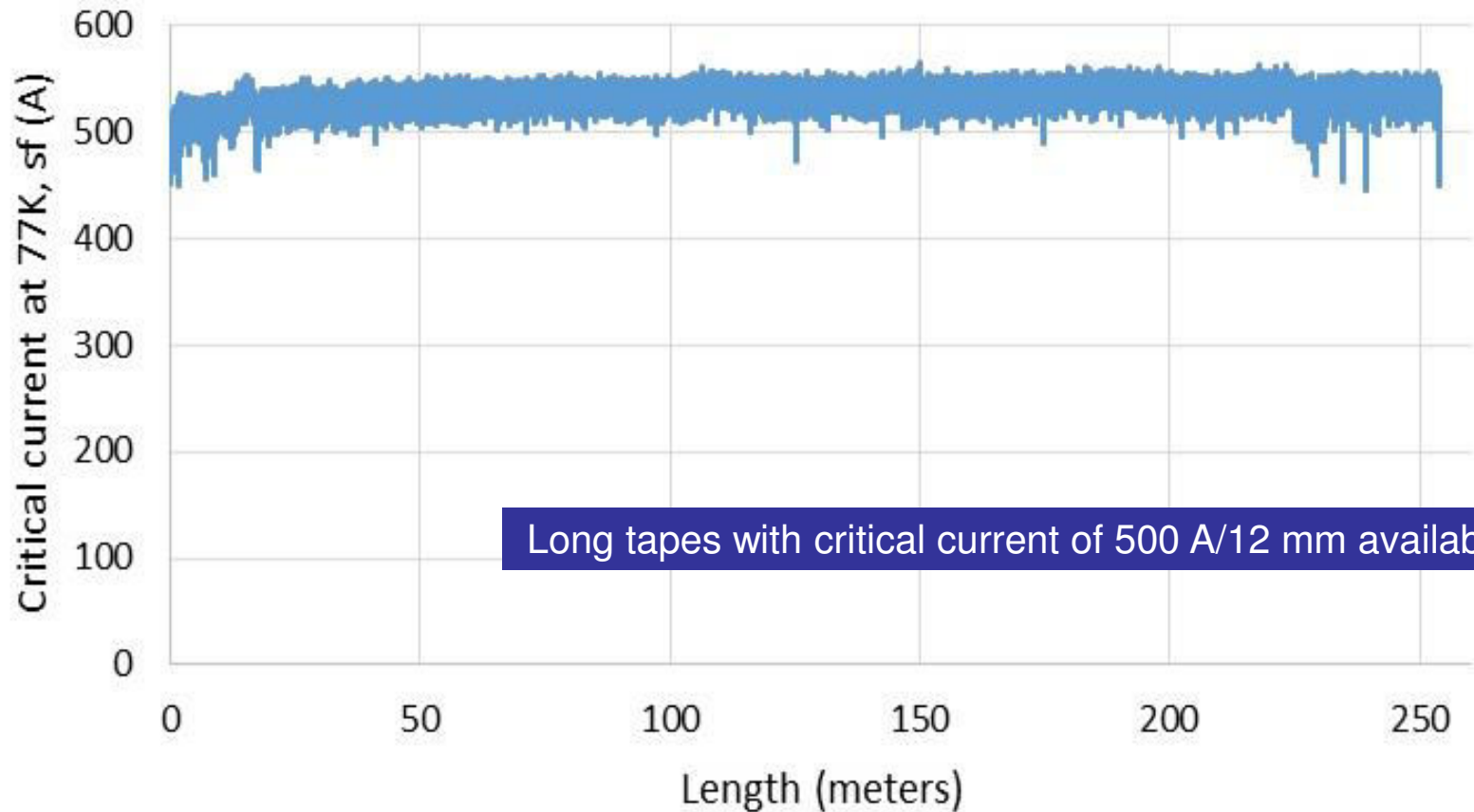
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Basic 2G HTS Wire Structure

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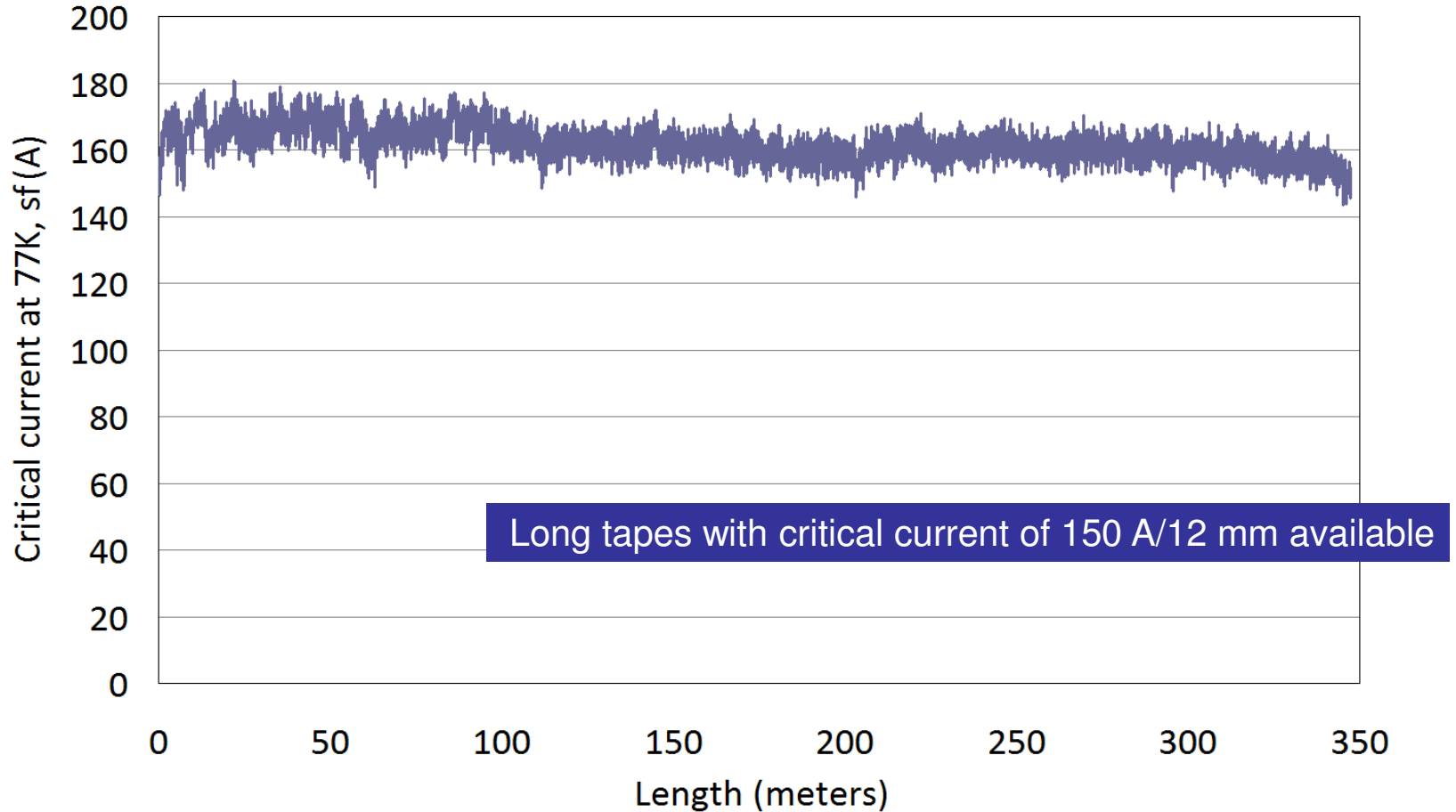


2G HTS Wire Properties



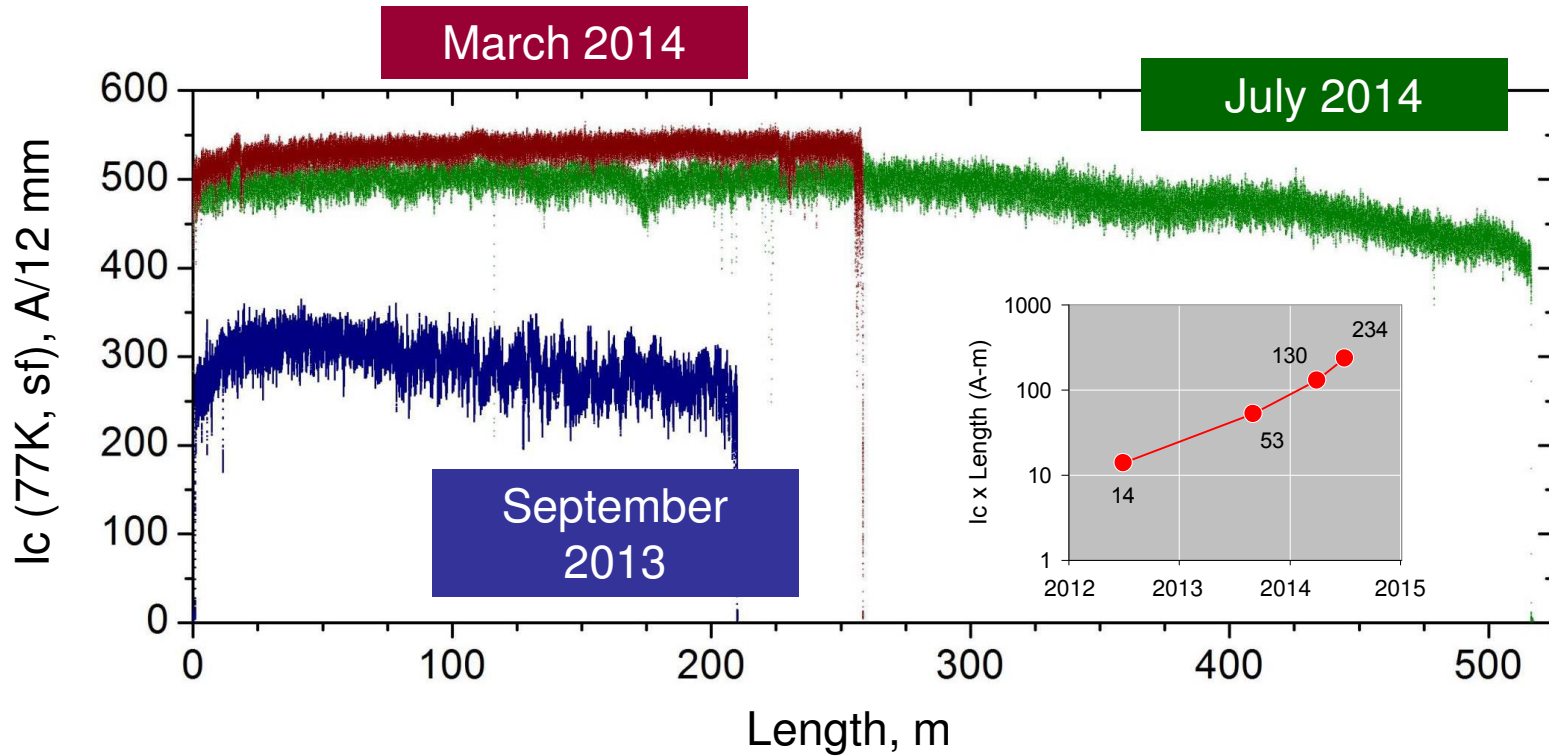
2G HTS Wire Properties

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2G HTS Wire – Our Progress in 2012-2014

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Short Summary

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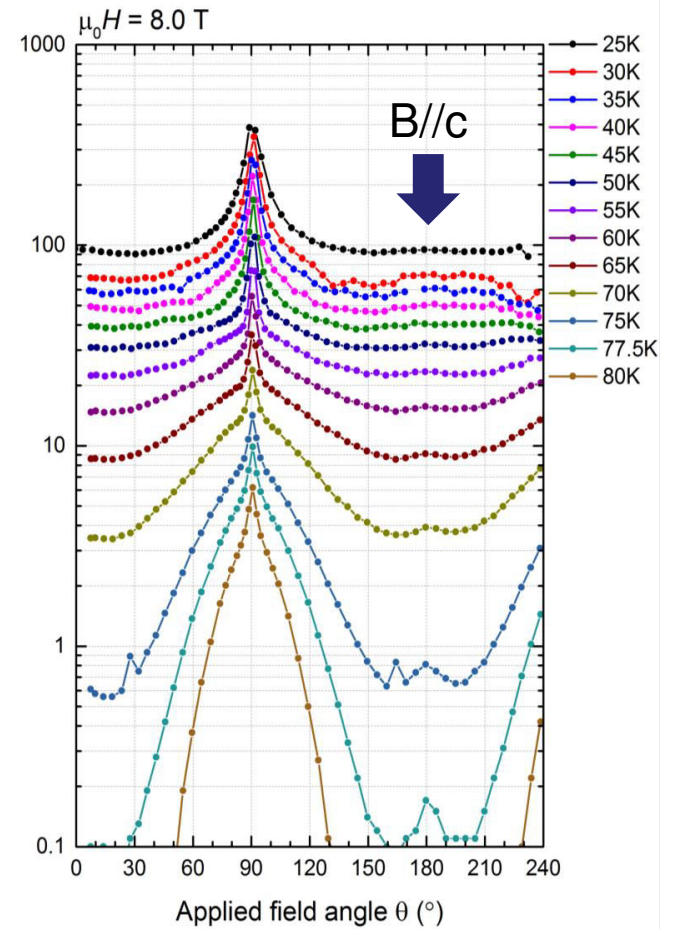
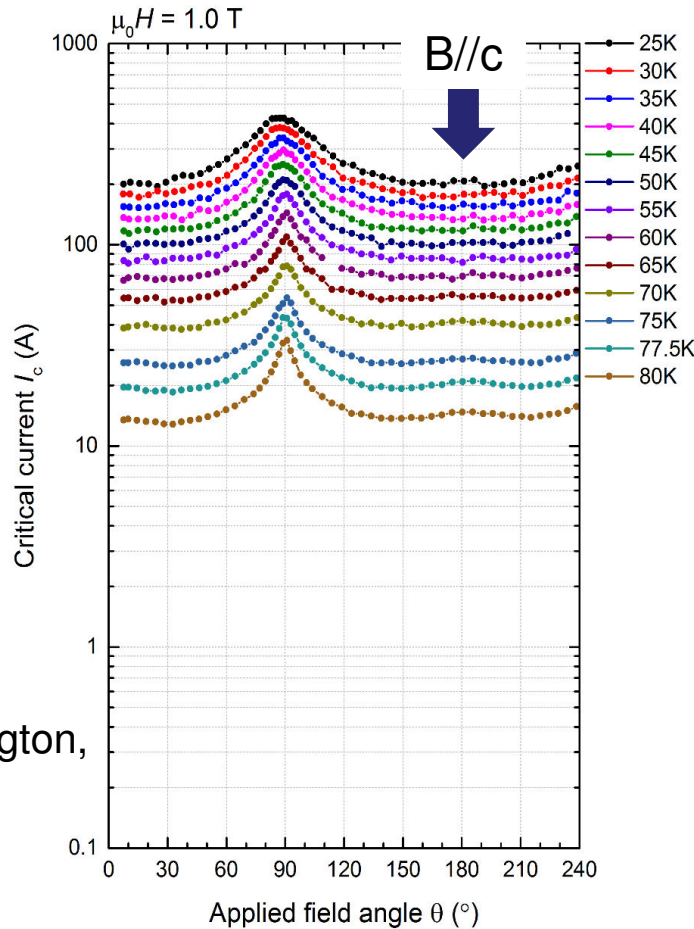
| Parameter | Value | |
|---------------------|-------------------|-----------|
| Single piece length | up to 500 m | |
| Substrate thickness | 60 or 100 microns | |
| Width | 4 mm | 12 mm |
| Ic (77K, sf) | 100-150 A | 300-500 A |
| Ic uniformity | ±10% | ±10% |

Customization:

- Any silver thickness
- Any copper thickness
- Lamination
- Isolation
- Solder-plating
- Joints
- ... we consider any other options

I_c in Magnetic Field

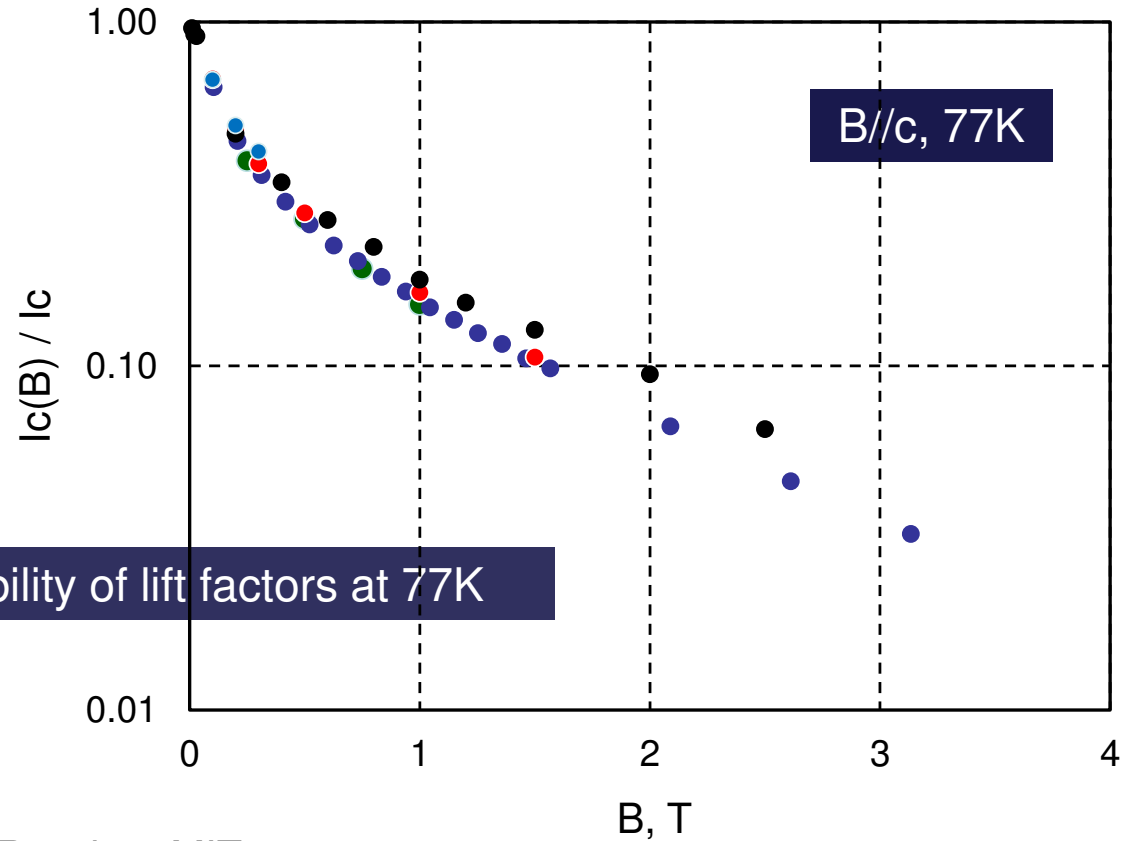
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Source :
RRI U Wellington,
HTS-110

4 mm wire

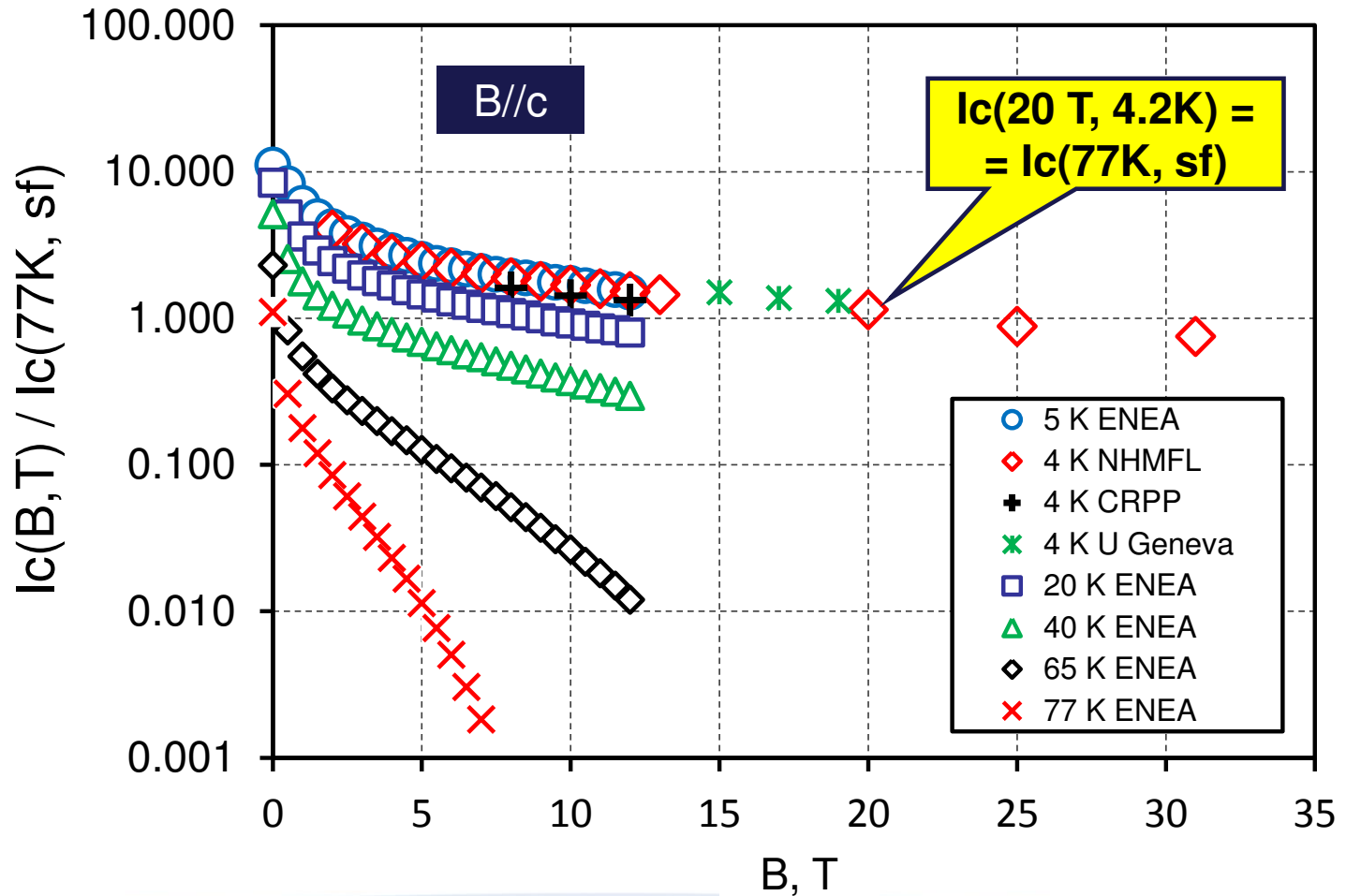
Lift Factor at 77K



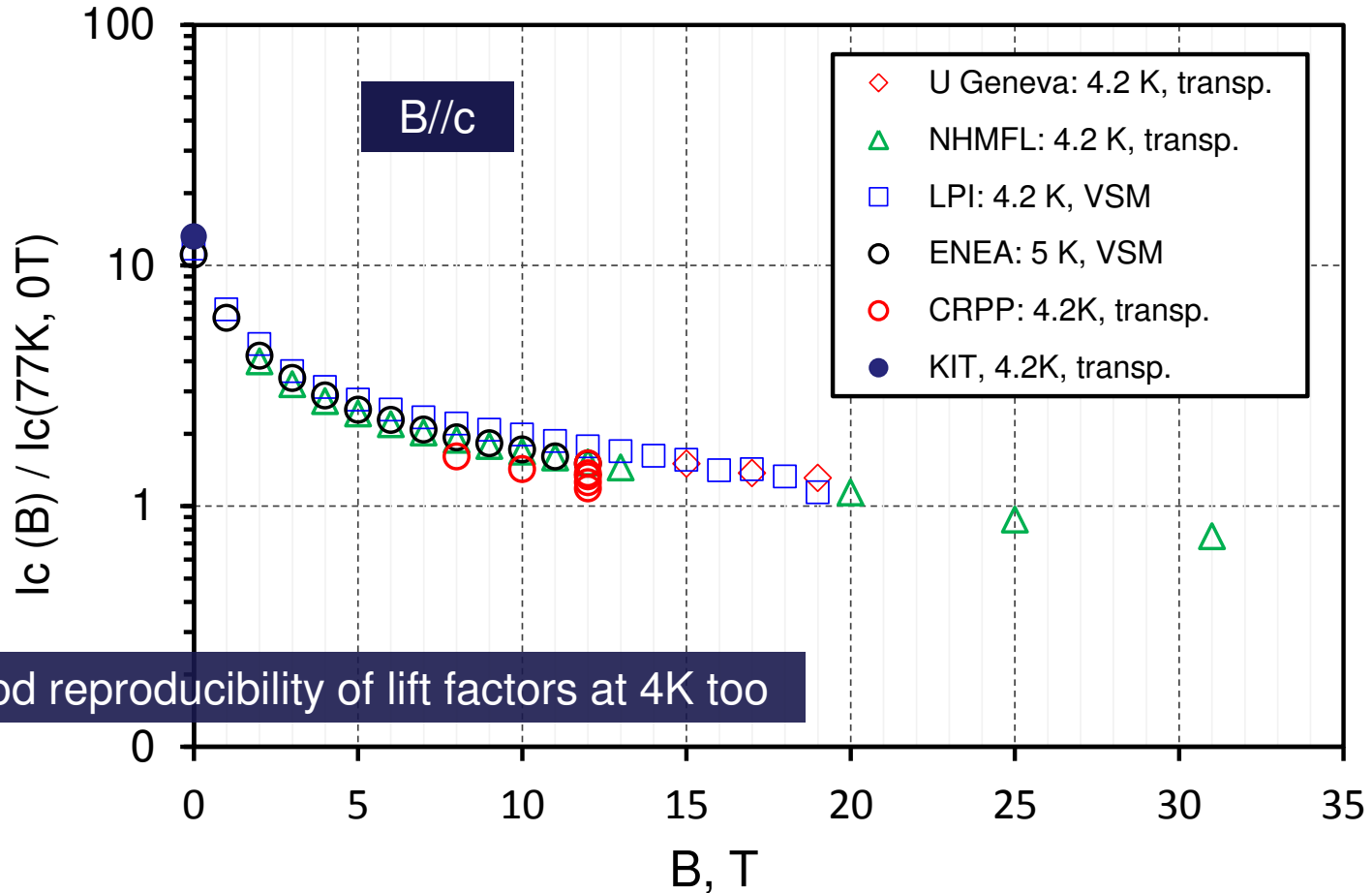
Source : 4 institutes in Russia + MIT

Lift Factor at 4 to 77K

SuperOx



Lift Factor at 4.2 K



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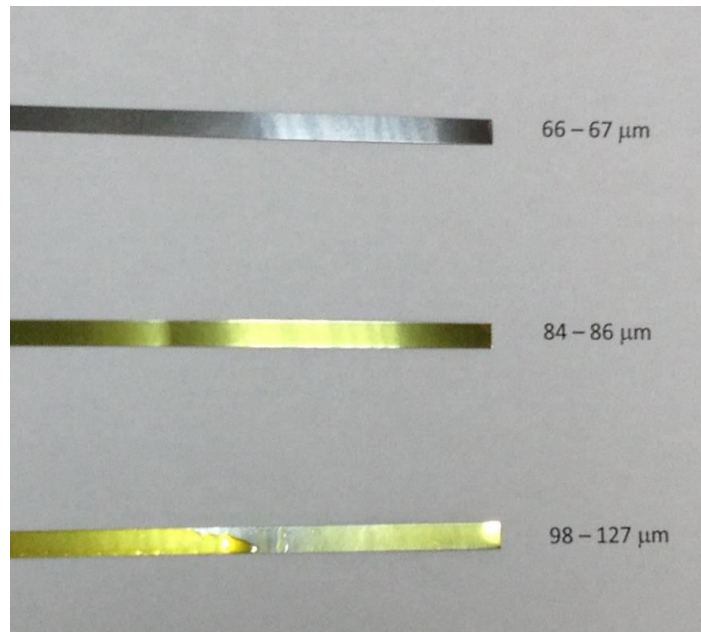
Surround Polyimide Coating

SuperOx



- Alternative to wrapping – more uniform and thinner insulation

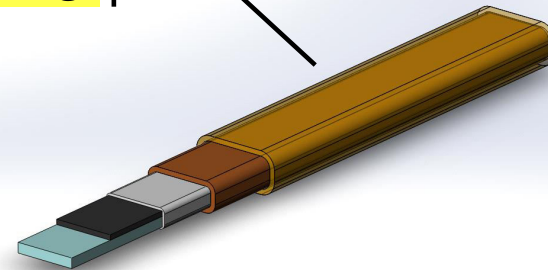
Variable thickness PI coating



bare tape

new SuperOx process

standard dip coating

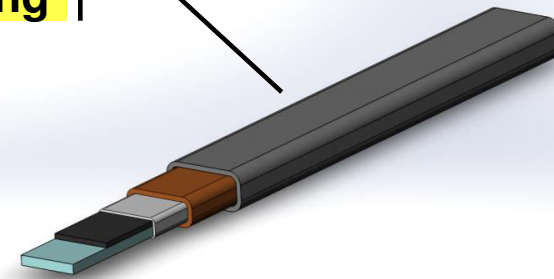
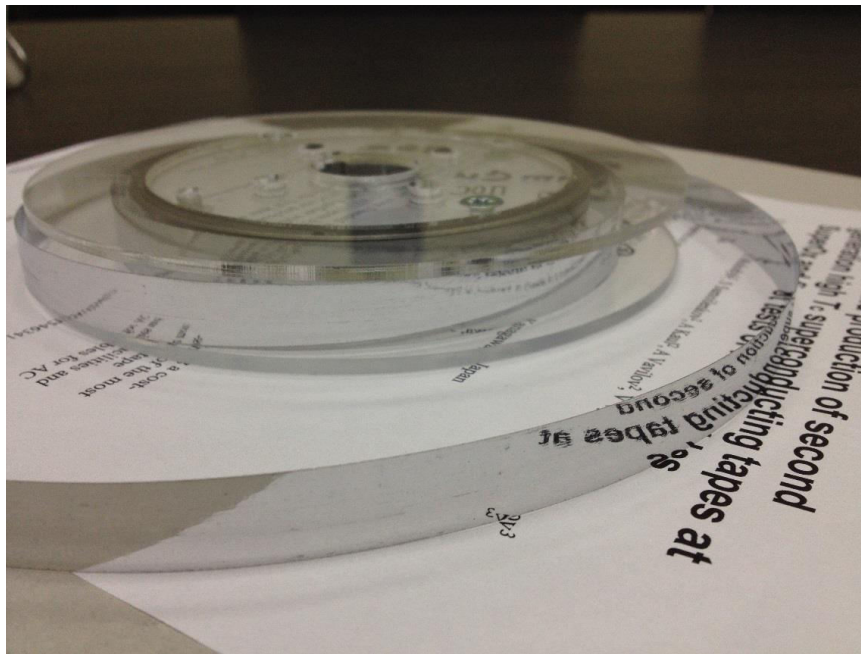


Solder-plated wire



- Useful for making stacks or as alternative stabilization

Variable thickness solder plating



- ~ 200°C PbSn
- ~ 120°C SnIn
- ~ 100°C PbBiSn (Rose's metal)
- etc...*

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2G HTS Wire Blocks for Magnetic Levitation **SuperOx**



- blocks made from 2G HTS wires provide stable levitation over PM
- viable alternative to HTS bulks – any form and size possible



Superconductor Week

Commercialization · Markets · Products
Business Developments · R&D · Cryogenics

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- EQUUS REPORTS CONTACT BETWEEN DISTANT QUBITS
- NANJING ENHANCES SC IN BiSe_2 COMPOUND
- OST/BRUKER COMPLETE ITER TF COIL WIRE
- LMU SYNTHESIZES HIGHER- T_c FERROMAGNET
- NORMAL STATE NODAL ELECTRO
- CAMBRIDGE INVESTIGATES CDW IN CUPRATES
- QUANTUM FLUCTUATIONS
- BNL OBSERVES QUANTUM FLUCTUATIONS AT 0 K
- HKU/TOHOKU REPORT SPECIFIC HEAT DATA FOR V_3SI
- SUPERCONDUCTIVITY ROUNDUP
- SUPERCONDUCTIVITY STOCK INDEX
- U.S. SUPERCONDUCTIVITY PATENTS

SuperOx Announces HTS Material for Maglev Applications

.....
..... Russian HTS company SuperOx has announced the development of a new superconducting material for Maglev and other devices that can be produced more easily and cheaply than existing alternatives.
..... The new technology, which utilizes 2G HTS tapes, is suitable for the creation of multi-layered blocks that could take the form of thin plates, cylinders, or bricks.
.....

..... Previously, HTS ceramics intended for Maglev applications took approximately four months to create. The resulting products were brittle, could only be manufactured in small quantities, and required a high amount of rare earth materials.
.....
.....

Levitation force is larger than 1 kg per 1 m of 12 mm 2G HTS tape



Thank you for your attention!

www.superox.ru/en