

IEA-HTS-Exco, at CIGG, Geneva, Switzerland

HTS Activity: China Update

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Superconductor Technology Co. Ltd)

Sept. 20, 2017

14th Chinese ASC, Tianjin University, Aug. 20-24, 2017.

1. Attendant: 620
2. PL 12, Oral 144, Poster 212
3. Exhibition and sponsor: 14 companies
Futong group, Western STC, CSIC(Nanjing), SSTC, SCSTC, Sumitomo, Innost,....
4. Contents: Like US ASC wire, applications, device, characteristic
5. Topics
HTS cable site tour (Futong group works)
HTS cable discussion meeting



Tianjin Univ. and all attendants group photo before meeting



campus



PL

Recent Features on Chinese HTS R&D

From 14th Chinese ASC, Tianjin University, Aug. 20-24, 2017.

1. YBCO wire 3 companies in Shanghai area
2. Fe wire in CAS, Beijing
3. Active Applications
 - FCL: high voltages, DC
 - Cables: Tian Jing (Futong group), Shanghai
4. Others
 - Xian group (LTS+ HTS)
 - MRI

China

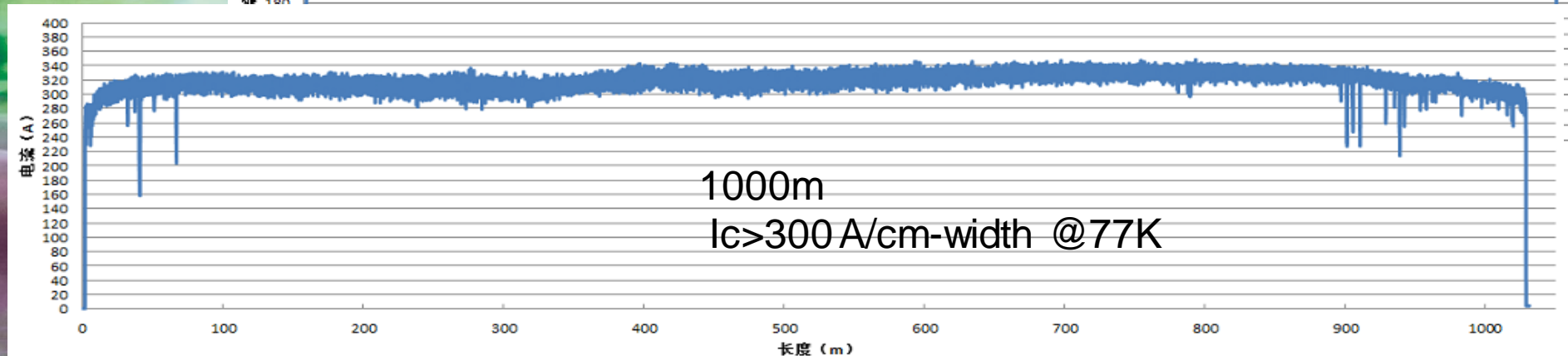
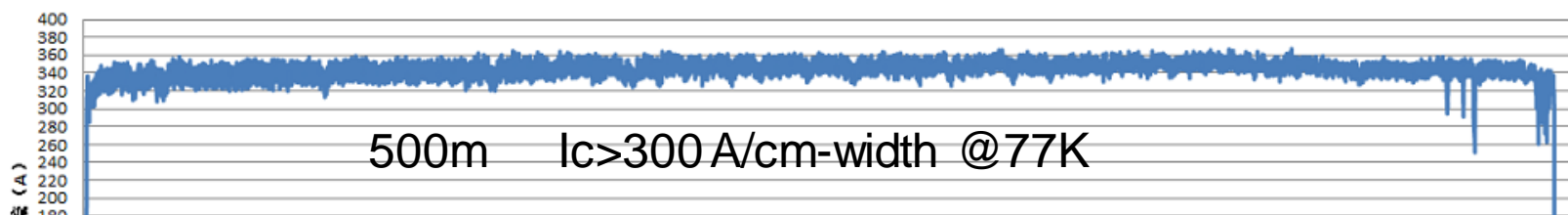
Research Teams for Materials (11 Teams)

Research Institute or Company		Research Activities			
NIN/Western Superconductor		NbTi, Nb ₃ Sn/Al, BSCCO-2212, 2223, MgB ₂ , YBCO Substrates			
IEE-CAS		2G HTS Wire Venture Company in Shanghai Area			
SHJT Univ/Shanghai	Group	Buffer		HTS	
Shanghai Univ/Shanghai	Company/ University	IBAD	NiW	PLD	MOD MOCVD
Suzhou-NANO	Shanghai Supercond. Technol. Co., Ltd (SSTC)/ Shanghai Jiao Tong Univ.	R2R		R2R	
BUT					
Innova Superconductor	Shanghai Creative Supercond. Technol. Co., Ltd (SCSTC)/ Shanghai Univ.	R2R	R2R	R2R	
Tianjing Hytech					
GRINM					
Peking Univ	Suzhou Advanced Materials (SAMRI)	R2R		R2R	
STUE					

SSTC Shanghai Superconductor Tech. Co., Ltd, SJTU



PLD-YBCO line
at SSTC



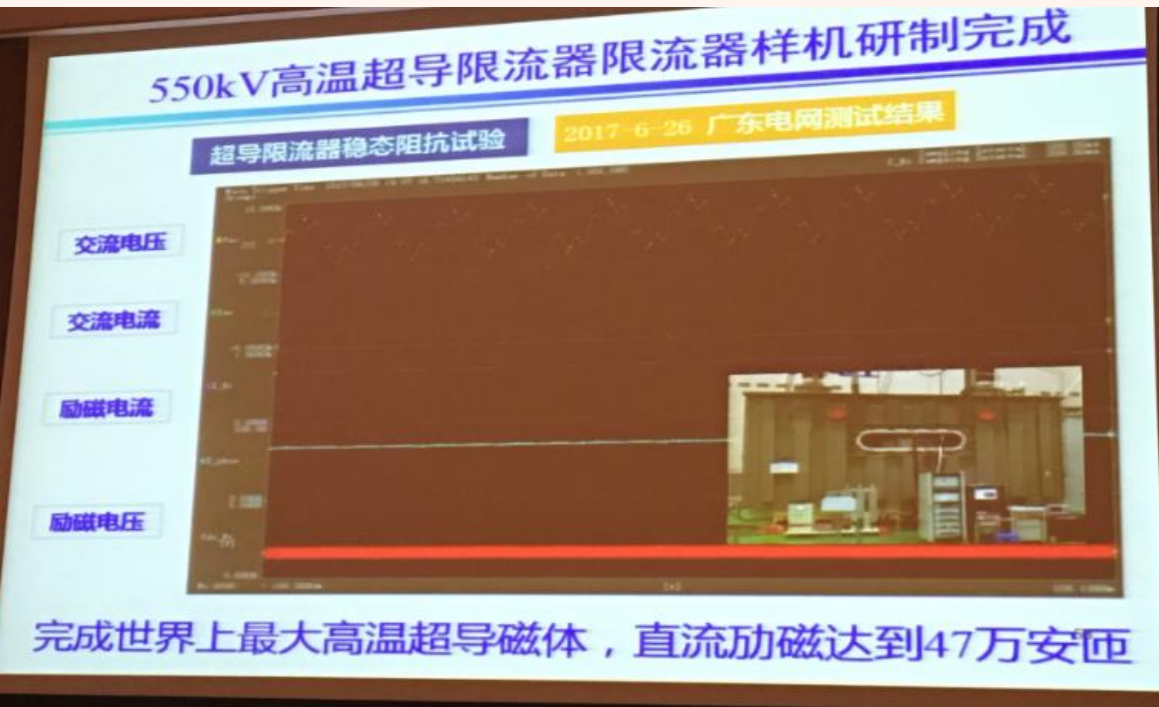
PLD -YBCO on IBAF with sharp texture now **1000m length**

Research Teams for Large-Scale Applications (15 Teams)

Research Institute or Company	Research Activities
IEE-CAS	FCL, Cable, SMES, Transformer, Electric Machine, NMR, MRI, High Field Magnet, accelerator magnet, Fusion Magnet and other applications
HUST	FCL, SMES, Electric Machine
WHI-712	Electric Machine
Tsinghua Univ	MRI, Cable, FCL, SMES
Tianjing Univ/Innopower	Cable, FCL
CEPRI	Cable, SMES, FCL
NCUEP	Cable
SWJTU	Maglev
SICT	Cable
Western Superconductor	MRI, High Field Magnet
Hefei-CAS	Fusion Magnet, High Field Magnet
IHEP-CAS	Accelerator Magnet, MRI, ADS magnet, Magnetic separation
IMP-CAS	Accelerator Magnet, ADS magnet
IAEC	cyclotron accelerator magnet
TIPC-CAS	Fusion Magnet, high field Magnet
SIAP-CAS	Magnet for FEL, Cavity

Cable, FCL active

550kV FCL at Xian group



550kV
Y+Bi wire
470KAT





■ Electrical Characteristics

- Design 35kV/2000A ~ 120MVA

■ Physical Characteristics

- Materials ~ 2G HTS Wire
- Length ~ 50m
- HTS Conductor Length ~13km
- Cold Dielectric Design

■ Hardware Deliverables

- Three ~50 m Long Phase Conductors
- Six 35kV Outdoor Terminations



Discussion for HTS Cable, Tianjin, 2017

Aug. 22 night



Members: Wire, Ref., Electric power companies, professors
at the conference hotel in Tianjin

HTS Cable Demonstration Site Tour

Aug. 24

Pudong Group
(Optical fiber)

Site: Tianjin Works

HTS cable demo.
35kV, 1kA, 1km
YBCO
SWCC wire, cable
supply

Conference program

C2, B207

主持人: 王秋良 (中国科学院电工研究所)
顾 晨 (清华大学)

论文编号 及时间	报告人	单位	报告题目
C2-01-I 10:30-10:50	王银顺	华北电力 大学	基于涂层导体临界电流准各向同性的超导导体究进展体
C2-02-I 10:50-11:10	马光同	西南交通 大学	REBCO涂层超导体的悬浮特性实验与仿真研究
C2-03-O 11:10-11:22	杨 侯	兰州大学	三维螺旋结构超导股线的力电行为研究
C2-04-O 11:22-11:34	叶新羽	富通集团 (天津) 超导 技术应用有 限公司	35 kV/1.0 kA冷绝缘超导电 缆通流能力和绝缘性能研究
C2-05-O 11:34-11:46	茹雁云	兰州大学	高温超导体力学行为的近场动力学分析
C2-06-O 11:46-11:58	雍华东	兰州大学	多芯超导线材中的力学建模
C2-07-O 11:58-12:10	游双榕	上海大学	基于二代高温超导带材的双 轭结构电磁铁3D仿真计算

Others

LTS, Fusion



Ceremony of ITER for the conductor: All conductor has successfully supplied.

MRI



MRI线材向国内MRI企业批量供货

近年来西部超导为国内MRI企业如上海联影、宁波健信、潍坊新力、成都奥泰提供线材，保障了1.5T/3.0T螺管型和0.7T开放式超导MRI系统相继研制成功，打破了国外垄断，大幅度降低了国产MRI系统的材料成本！

西部超导为我国发展自主知识产权、低成本超导MRI系统从源头上解决了核心的NbTi超导线材。



MRI industry now growing rapidly in China. Many companies emerged.

Prf. Zhang of NIN, Xian.

Progress of SC and its application in China

Materials

YBCO CC: 50m, $I_c=140A@77K$
Laboratory scale

YBCO CC: 1000m, $I_c=280A@77K$
Industry scale

LTS :
Starting mass production

180t NbTi and 30t Nb₃Sn strands for ITER, 100t strands for MRI and HEP application

2011

2012

2013

2014

2015

Application

Power DEMO : HTS Power Substation

Cable :
380m, 10000A DC

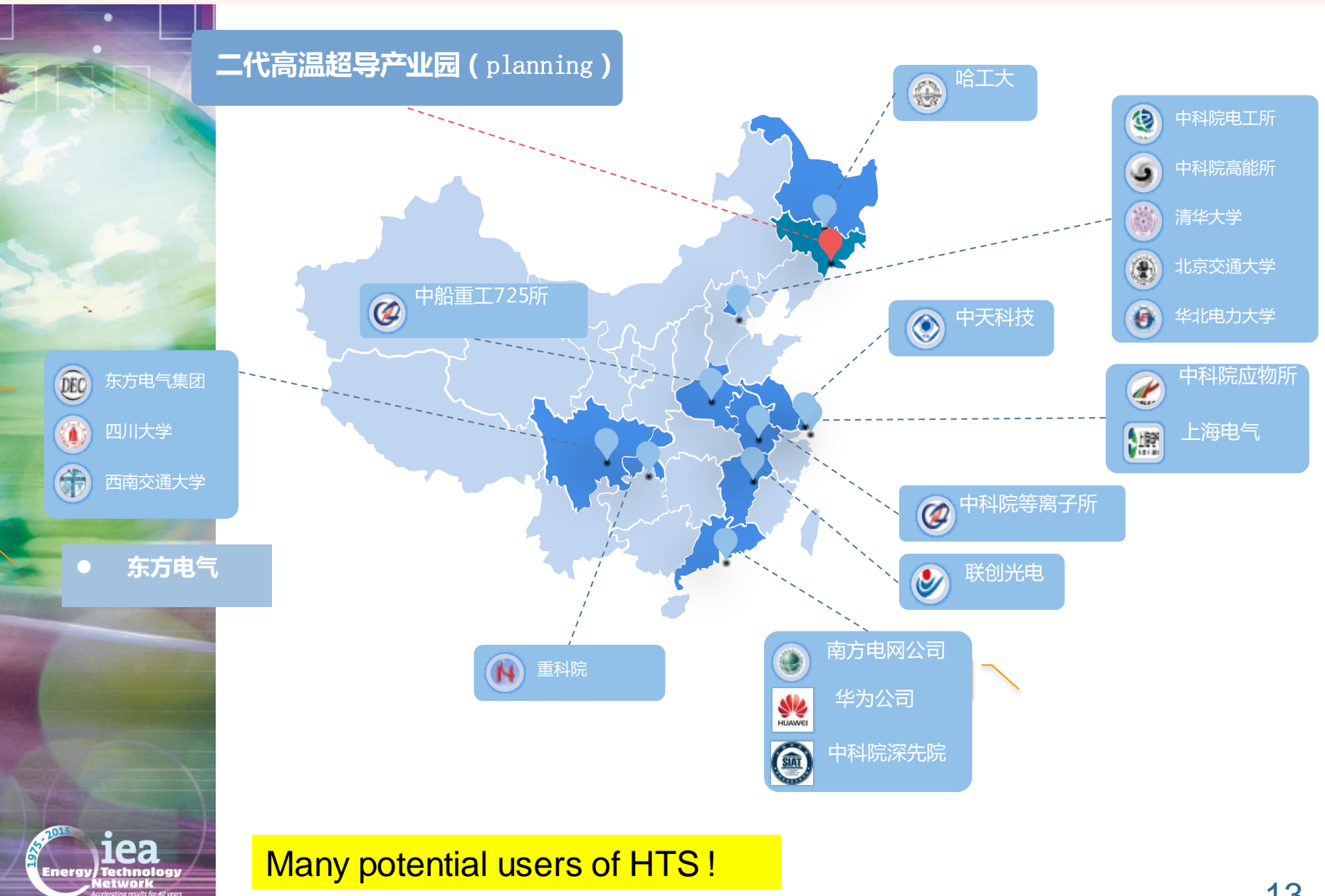
FCL :
220kV, 3 Phase

FCL :
550kV, 3 Phase

In China still continuing active HTS R&D

Prf. Zhang of NIN, Xian.

Institutes trying HTS (YBCO) Application



14th Chinese ASC, Tianjin University

Many attendant gathered from almost all area in China.





END