SRF09 Berlin · Dresden

14th INTERNATIONAL CONFERENCE ON

RF SUPERCONDUCTIVITY

DBB Forum, Berlin
September 20th–25th, 2009

Tutorials September 17th–19th, 2009
at FZ-Dresden

Proceedings SRF 2009

Organized by

HELMHOLTZ ZENTRUM BERLIN
für Materialien und Energie

Forschungszentrum Dresden Rossendorf

HZB Bericht 2
November 2009

Contact

SRF 2009 • Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Elektronenspeicherring BESSY II
Albert-Einstein-Str. 15 • 12489 Berlin • Germany
Telephone: +49 30 6392 4651 • Fax: +49 30 6392 4632 • E-mail: srf2009@helmholtz-berlin.de

srf2009.helmholtz-berlin.de

Foreword

The 14th International Conference on RF Superconductivity took place from September 20-25, only a few hundred meters from the old Checkpoint Charlie. SRF 2009 was organized by the Helmholtz Zentrum Berlin and the Forschungszentrum Dresden Rossendorf. The main programme was preceded by a 3-day tutorial at the Forschungszentrum Dresden-Rossendorf. The conference participation far exceeded our expectations with over 300 registrants and it continued the growing trend over the last 28 years. We were particularly pleased that 90 people registered for the tutorials and that many researchers were new to the field of SRF.

The first SRF Workshop was held at the Forschungszentrum Karlsruhe in 1981. In recognition of the fact that SRF has grown dramatically both in size and international importance, the International Program Committee voted in 2008 to change the title from "Workshop" to "Conference."
However, to underscore the Series' roots and tradition as a workshop, it was decided to continue the old numbering, thus making SRF 2009 the 14th in the series.

A total of 56 talks and 166 posters were presented at the conference, in addition to the thirteen tutorials that provided an excellent overview of SRF. Many talks were presented by young researchers, and prizes were awarded at the conference dinner to Alexander Romanenko and Sachary Conway for their excellent research. Mid-week, the conference returned to Dresden for a visit of the ELBE SRF Free-Electron Laser and the historic centre of Dresden, including the famous "Frauenkirche". A special session provided the opportunity to honour two SRF experts entering retirement, Dieter Proch and Hasan Padamsee. Over the last 30 years both of them have left their indelible mark on the field of SRF and their contributions were a key to the success of the SRF Conference Series.

On behalf of the International Program Committee and the Local Organizing Committee I would like to express my gratitude for the financial support SRF 09 received from institutional and industrial sponsors, as well as 12 industrial exhibitors. This support enabled SRF 2009 to pay travel and accommodation for 10 students who otherwise would not have been able to attend the conference.

I would also like to extend a special thank you to the Local Organizing Committee whose tremendous dedication before and during the conference contributed to the great success of SRF 2009.

Finally, though, the success of any conference depends on the participants. There is no doubt that SRF 2009 was an inspiring week with excellent talks and posters that provided the basis for a lively discussion. Warmest thanks therefore go out to all participants!

Jens Knobloch
SRF 2009 Conference Chairman

Contents

Conference Organisation

International Program Committee

D. Proch, DESY (IPC Chair)
C. Antoine, Saclay
J. Chen, Peking University
J. Delayen, Jefferson Lab (JACoW Liaison)
H. Edwards, Fermilab
W. Hartung, MSU
M. Kelly, ANL
P. Kneisel, Jefferson Lab
J. Knobloch, HZB (Conference Chair)
R. Losito, CERN
S. Noguchi, KEK
H. Padamsee, Cornell University
V. Palmieri, INFN-LNL & Padua University
T. Tajima, LANL

Proceedings Editors

M. Abo-Bakr (HZB)
B. Kuske (HZB)
A. Liebezeit (FZD)
S. Voronenko (HZB)
V. Schaa (GSI)

Local Organizing Committee

J. Knobloch (HZB) Conference Chair
W. Anders (HZB) LOC Chair

P. Michel (FZD) LOC Co-Chair
M. Abo-Bakr (HZB)
A. Arnold (FZD)
T. Frederking, HZB
N. Neumann (HZB) Secretary - Berlin
P. Joehnk (FZD)
T. Kamps (HZB)
O. Kugeler (HZB)
B. Kuske (HZB)
R. Müller (HZB)
A. Neumann (HZB)
P. Neumann (FZD) Secretary - Dresden
T. Quast (HZB)
A. Salhi (HZB) Secretary - Berlin
J. Teichert (FZD)

Institutional Sponsors

Deutsche Forschungsgemeinschaft DFG

DESY

Los Alamos NATIONAL LABORATORY EST. 1943

Industrial Sponsors

NIOWAVE www.niowaveinc.com

RI Research Instruments GmbH
A former ACCEL Instruments GmbH activity
research instruments

SDMS la chaudronnerie blanche®

Industrial Exhibitors

Advanced Energy Systems, Inc.

BRUKER

CPI Communications & Power Industries

Heraeus

Instrumentation Technologies

PLANSEE

RI Research Instruments GmbH
A former ACCEL Instruments GmbH activity
research instruments

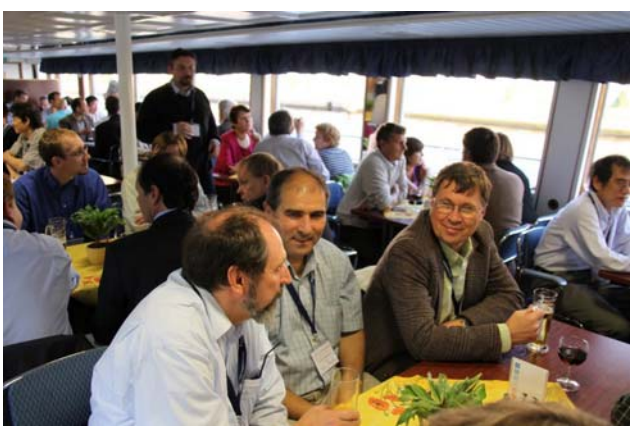
Shakespeare ENGINEERING COMPONENTS

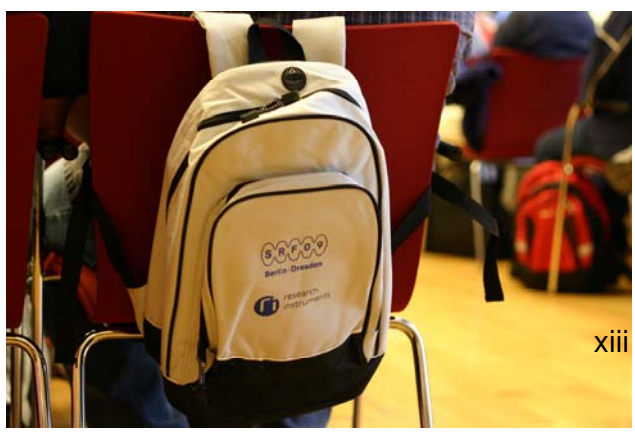
東京電解 Tokyo Denkai

TRANSTECHNIK

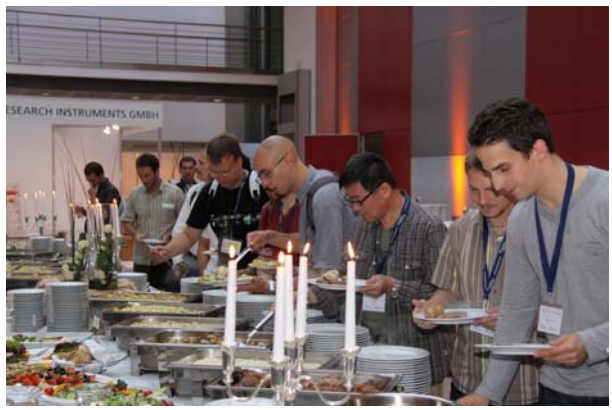
Pictures

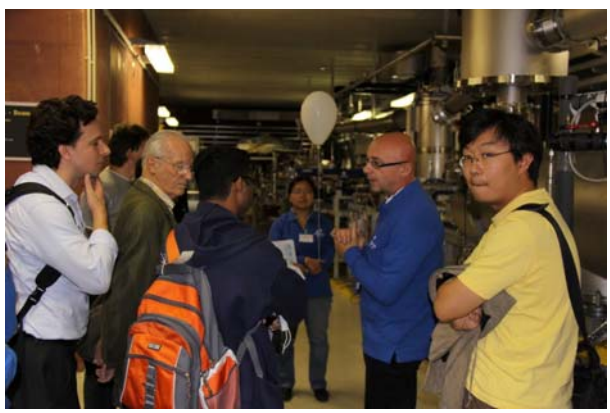

Two Sources – One Centre – One Vision
HELMHOLTZ
ZENTRUM BERLIN
für Materialien und Energie

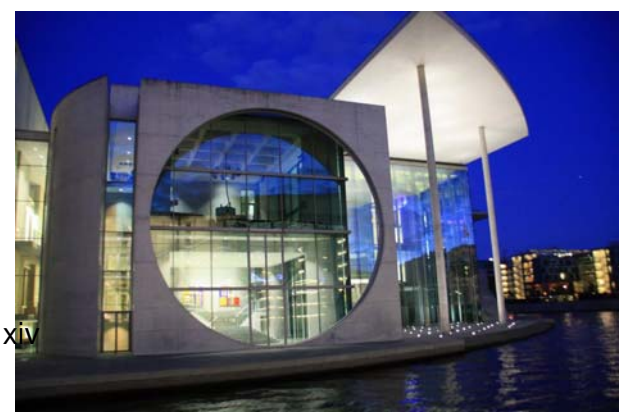



SRF09
Berlin-Dresden

Pictures







Scientific Programme: Tutorials

Overview tutorials were held prior to the conference, Sept. 17 – 19, in Dresden.

Thursday, September 17

9:30 **Welcome R. Sauerbrey**, Scientific Director *FZD*
9:45 **Lecture 1: Basic Principles of RF Superconductivity and SC Cavities** H. Padamsee, *Cornell University*11:10 **Lecture 2: High-beta Cavity Design** K. Saito, *KEK*
12:20 **Lecture 3: Low and Intermediate Beta Cavity Design** A. Facco, *INFN Legnano*
14:40 **Lecture 4: SC Cavity Material, Fabrication and QA** W. Singer, *DESY*
16:00 **Lecture 5: Cavity Preparation and Limits in Cavity Performance** J. Mammosser, *ORNL*

Friday, September 18

9:00 **Lecture 6: LLRF Control Systems and Tuning Systems** C. Hovater, *JLAB*
10:10 **Lecture 7: Design and Fabrication Issues of High Power and Higher Order Modes Coupler for Superconducting Cavities.** S. Noguchi, *KEK*
11:30 **Lecture 8: RF Power Sources** J. Jacob, *ESRF*
12:40 **Guided ELBE Tour**
15:00 **Lecture 9: Methods and Simulation Tools for Cavity Design** U. van Rienen, *Rostock University*
16:20 **Lecture 10: Fundamentals of Superconductivity, High-T SC, Trends and Application** L. Schultz, *IFW Dresden*

Saturday, September 19

9:00 **Lecture 11: Operational Aspects of SC RF Cavities with Beam** S. Belomestnykh, *Cornell University*
10:10 **Lecture 12: Fundamentals of Cryomodule Design and Module Engineering** N. Ohuchi, *KEK*
11:30 **Lecture 13: He Refrigerators for Accelerators** Ch. Haberstroh, *Dresden University*

Scientific Programme: Conference

Monday, September 21

Session 1: ProgressReports/ Ongoing Projects I
(Chair: Jia-er Chen – *NSFC*)

9:00 **SRF2009: Welcome & Logistics** (30min) Anke Kaysser-Pyzalla, Jens Knobloch *Helmholtz-Zentrum Berlin für Materialien und Energie GmbH*
9:30 **FLASH** (25min) Katja Honkavaara – *DESY*
9:55 **The European XFEL Based on Superconducting Technology** (25min) Hans Weise - *DESY*

Session 2: Progress Reports/Ongoing Projects II
(Chair: Shuichi Noguchi – *KEK*)

10:40 **Third Harmonic System at Fermilab/FLASH** Elvin Robert Harms - *Fermilab*
11:00 **Jlab Upgrade and High Current Cavity Developments** Joseph Preble - *JLAB*
11:25 **Overview of Superconducting Photoinjectors** Andre Arnold – *FZD*
11:50 **High-current ERL Injector** Matthias Liepe - *CLASSE*
12:15 **SRF System Operation of the ALICE ERL Facility** Peter McIntosh - *STFC/DL/ASTeC*
12:40 **ERL Prototype at BNL** Ilan Ben-Zvi - *BNL*

Session 3: Progress Reports/Ongoing Projects III
(Chair: Michael Kelly – *ANL*)

14:00 **TESLA Technology in China** Jia-er Chen – *NSFC*
14:40 **Impact of CARE-SRF on FLASH/XFEL and Other Projects** Dieter Proch - *DESY*
15:05 **Superconducting PAUL Trap for Antiprotons** Daniel Barna - *University of Tokyo*
15:20 **The ATLAS Energy Upgrade Cryomodule** Joel D. Fuerst - *ANL*
15:40 **The MSU/NSCL Re-Accelerator ReA3** Oliver Karl Kester - *NSCL*

Session 4: Progress Reports/Ongoing Projects IV
(Chair: Walter Hartung – *NSCL*)

16:30 **SNS & Upgrade** John David Mammosser - *ORNL*
16:50 **STF STATUS AND PLANS** Hitoshi Hayano - *KEK*
17:10 **SPIRAL2** Tomas Junquera - *IPN*
17:30 **The SARAF CW 40 MeV Proton/Deuteron Accelerator** Israel Mardor - *Soreq NRC*
17:45 **ISAC-II: Status of the 20 MV Upgrade** Robert Edward Laxdal - *TRIUMF*

Tuesday, September 22

Session 1: Basic SRF R&D I
(Chair: Vincenzo Palmieri - *INFN/LNL*)

8:30 **High Field Q-slope and the Baking Effect** Gianluigi Ciovati - *JLAB*
8:50 **Crystalline microstructure role in the high-field Q-slope** Alexander S Romanenko – *CLASSE*

9:05 **Advances in Material Studies for SRF** Thomas R. Bieler - *Michigan State University*
9:30 **Review of Results from Temperature Mapping and Subsequent Cavity Inspections** Wolf-Dietrich Moeller - *DESY*
9:50 **Locating Quenches with 2nd Sound** Zachary Alan Conway - *CLASSE*
10:05 **Basic Understanding for the Various Causes of Quench** David Meidlinger - *CLASSE*

Session 2: Basic SRF R&D II

(Chair: Claire Antoine – *CEA*)

10:40 **Review of Optical Inspection Methods and** Results Ken Watanabe - *KEK*
10:55 **Near-Field Microwave Microscopy of Superconducting Materials** Steven Mark Anlage – *UMD*
11:10 **RF Characterization of Superconducting Samples** Tobias Junginger - *MPI-K*
11:25 **Point Contact Tunnelling at the SC Gap Before/After Baking & Atomic Layer Deposition** Thomas Proslier - *IIT*
11:45 **Microstructure Studies of Nb** Derek C Baars - *Michigan State University*
12:00 **A15 Nb3Sn Films by Multilayer Sputtering & Review of SRF Tests** Antonio Alessandro Rossi - *INFN/LNL*
12:15 **A15 Superconductors by Thermal Diffusion in 6 GHz Cavities** Silvia Maria Deambrosis - *INFN/LNL*
12:30 **Review of RF Properties of NbN and MgB2 Thin Coating on Nb Samples and Cavities** Grigory V. Eremeev - *CLASSE*

Poster Session I

14:00-17:00 (Including Coffee Break)
Progress Reports and Ongoing Projects
Future Projects
Operating Experience with SRF Accelerators
Measurement Techniques
Cavity Performance Limiting Mechanisms
Material Studies

Hot Topics

17:00 **Hot Topic I: Module and Coupler Production: A View from Industry** Dieter Proch – *DESY*
18:00 **Hot Topic II: Is Niobium at the End of the Road? At What Front Should We Do Battle?** Hasan Padamsee & Peter Kneisel - *Cornell University & JLab*

Thursday, September 24

Session 1: SRF Technology R&D I

(Chair: Hasan Padamsee - *Cornell University*)

8:30 **Characterization of Ingot Material for SRF Cavity Production** Jayanta Mondal - *BARC*
8:45 **Basic Studies for Process Parameter Developmenst for EP/HPR/Snow Cleaning** Detlef Reschke - *DESY*
9:05 **Electropolishing without HF: Ready for Cavity Treatment? - What Are the Naked Facts?** Vincenzo Palmieri - *INFN/LNL*

9:25 **Progress With Large Grain Cavities & Seamless Cavities** Waldemar Singer - *DESY*
9:50 **Multi-wire Slicing of Large Grain Ingot Material** Kenji Saito - *KEK*
10:05 **New Cavity Shape Developments for Low Beta Applications** Holger Podlech - *IAP*

Session 2: SRF Technology R&D II
(Chair: Tsuyoshi Tajima – *LANL*)

10:40 **New Cavity Shape Developments for Crabbing Applications** Graeme Burt - *Cockcroft Institute*
11:00 **Advances and Performance of Input Couplers at KEK** Eiji Kako - *KEK*
11:20 **Results from ANL/FNAL and Weld Zone Quenching** Genfa Wu - *Fermilab*
11:40 **SPIRAL2 cryomodules: Status and First Test Results** Guillaume Olry - *IPN*
12:00 **Indian Cavity Fabrication Facility & Test Results** Prakash N Potukuchi - *IUAC*
12:20 **Lessons Learned from the 9 mA Test** Brian Chase - *Fermilab*

Poster Session II

14:00-17:00 (Including Coffee Break)
Cavity Design
Ancillary Systems
Cavity Preparation and Production
High Current Issues and Beam Dynamics

Friday, September 25

Session 1: Future Projects I
(Chair: Jean Roger Delayen – *JLAB*)

8:30 **Project X** Robert Kephart - *Fermilab*
8:50 **FRIB: A New Accelerator Facility for the Production of Rare Isotope Beams** Richard York - *NSCL*
9:10 **5GeV 100 mA ERL** Georg H. Hoffstaetter - *CLASSE*
9:30 **Compact ERL Linac** Kensei Umemori – *KEK*
9:45 **The Superconducting Prototype Linac for IFMIF** Pierre Bosland - *CEA*
10:00 **e- linac for RIB** Shane Rupert Koscielniak - *TRIUMF*

Session 2: Future Projects II
(Chair: Jens Knobloch - *Helmholtz-Zentrum Berlin für Materialien und Energie GmbH*)

10:40 **Future SRF-Linac Based Light Sources: Initiatives and Issues** Joseph Bisognano - *UW-Madison/SRC*
11:05 **The ESS SC linear accelerator** Mats Lindroos - *ESS-S*
11:25 **HIE-Isolde: The Superconducting RIB Linac at CERN** Matteo Pasini - *Instituut voor Kern- en Stralingsfysica, K. U. Leuven*
11:45 **SPL** Roland Garoby - *CERN*
12:05 **J-PARC Upgrade** Nobuo Ouchi - *JAEA/J-PARC*
12:25 **ILC** Kaoru Yokoya – *KEK*
12:50 **Student Awards and End of Conference**