15th International Conference on RF Superconductivity

(SRF 2011)

Chicago, Illinois, USA
25-29 July 2011

# Contents

## Preface

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreword</td>
<td>i</td>
</tr>
<tr>
<td>Contents</td>
<td>N/A</td>
</tr>
<tr>
<td>Committees</td>
<td>v</td>
</tr>
<tr>
<td>Pictures</td>
<td>N/A</td>
</tr>
</tbody>
</table>

## Papers

<table>
<thead>
<tr>
<th>Paper Code</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOIOA01</td>
<td>Challenges in SRF Module Production for the European XFEL</td>
<td>2</td>
</tr>
<tr>
<td>MOIOA02</td>
<td>Advances in SRF Development for ILC</td>
<td>7</td>
</tr>
<tr>
<td>MOIOA03</td>
<td>Recent SRF Developments for ERLs</td>
<td>N/A</td>
</tr>
<tr>
<td>MOIOA04</td>
<td>SRF Challenges for Improving Operational Electron Linacs</td>
<td>14</td>
</tr>
<tr>
<td>MOIOB01</td>
<td>SRF Development for High Energy Physics</td>
<td>N/A</td>
</tr>
<tr>
<td>MOIOB02</td>
<td>Advances in SRF for Low Beta Ion Linacs</td>
<td>N/A</td>
</tr>
<tr>
<td>MOIOB03</td>
<td>Advances in SRF for Neutron Sources</td>
<td>N/A</td>
</tr>
<tr>
<td>MOIOB04</td>
<td>Survey of SRF Guns</td>
<td>23</td>
</tr>
<tr>
<td>MOIOB05</td>
<td>Operational Experience with SRF Cavities for Light Sources</td>
<td>27</td>
</tr>
<tr>
<td>MOIOB06</td>
<td>Hot Topics: Source of Quench Producing Defects</td>
<td>N/A</td>
</tr>
<tr>
<td>MOP0001</td>
<td>Commercial Superconducting Electron Linacs</td>
<td>N/A</td>
</tr>
<tr>
<td>MOP0003</td>
<td>650 MHz Cryomodules for Project X at Fermilab – Requirements and Concepts</td>
<td>34</td>
</tr>
<tr>
<td>MOP0004</td>
<td>Modified SRF Photoinjector for the ELBE at HZDR</td>
<td>39</td>
</tr>
<tr>
<td>MOP0005</td>
<td>Conceptual Design of the Superconducting Proton Linac (SPL) Short Cryo-module</td>
<td>43</td>
</tr>
<tr>
<td>MOP0006</td>
<td>Status and Plans for an SRF Accelerator Test Facility at Fermilab</td>
<td>46</td>
</tr>
<tr>
<td>MOP0007</td>
<td>Test of Components for the S-DALINAC Injector Upgrade*</td>
<td>50</td>
</tr>
<tr>
<td>MOP0008</td>
<td>RF and SRF Layout of BERLinPro</td>
<td>53</td>
</tr>
<tr>
<td>MOP0009</td>
<td>Design Status of the SRF Linac Systems for the Facility for Rare Isotope Beams</td>
<td>56</td>
</tr>
<tr>
<td>MOP0010</td>
<td>Update on Module Measurements for the XFEL Prototype Modules</td>
<td>65</td>
</tr>
<tr>
<td>MOP0011</td>
<td>Status of SARAF Superconducting Acceleration Module</td>
<td>69</td>
</tr>
<tr>
<td>MOP0012</td>
<td>Overview of ILC High Gradient Cavity R&amp;D at Jefferson Lab</td>
<td>74</td>
</tr>
<tr>
<td>MOP0013</td>
<td>RF Test Results from Cryomodule 1 at the Fermilab SRF Beam Test Facility</td>
<td>79</td>
</tr>
<tr>
<td>MOP0014</td>
<td>Design of the Fundamental Power Coupler and Photocathode Inserts for the 112 MHz Superconducting Electron Gun</td>
<td>83</td>
</tr>
<tr>
<td>MOP0015</td>
<td>IHEP 1.3GHz SRF Technology R&amp;D Status</td>
<td>87</td>
</tr>
<tr>
<td>MOP0016</td>
<td>Superconducting RF for the Cornell Energy-Recovery Linac Main Linac</td>
<td>90</td>
</tr>
<tr>
<td>MOP0017</td>
<td>Performance Limitation Studies on ISAC-II QWR’s and e-Linac Elliptical Cavities at TRIUMF</td>
<td>97</td>
</tr>
<tr>
<td>MOP0018</td>
<td>The Upgraded Injector Cryostat-Module and Upcoming Improvements at the S-DALINAC</td>
<td>100</td>
</tr>
<tr>
<td>MOP0019</td>
<td>Minimizing Microphonics Detuning by Optimization of Stiffening Rings</td>
<td>103</td>
</tr>
<tr>
<td>MOP0020</td>
<td>Nine-cell Elliptical Cavity Development at TRIUMF</td>
<td>107</td>
</tr>
<tr>
<td>MOP0021</td>
<td>Electromechanical Design of 704MHz $\beta=0.65$ SC Proton Cavity</td>
<td>110</td>
</tr>
<tr>
<td>MOP0022</td>
<td>Higher Order Mode Properties of Superconducting Two-Spoke Cavities</td>
<td>114</td>
</tr>
<tr>
<td>MOP0023</td>
<td>Low Temperature Test of a Low-Beta Elliptical Cavity for PEFP Linac Extension</td>
<td>117</td>
</tr>
<tr>
<td>MOP0024</td>
<td>Design of Single Spoke Resonators for Project X</td>
<td>122</td>
</tr>
<tr>
<td>MOP0025</td>
<td>High-Frequency and Mechanical Basic Analysis of Conical Half-Wave Resonator</td>
<td>127</td>
</tr>
<tr>
<td>MOP0026</td>
<td>$\beta = 0.285$ Half-Wave Resonator for FRIB</td>
<td>132</td>
</tr>
<tr>
<td>MOP0027</td>
<td>Analysis of HOM Properties of Superconducting Parallel-Bar Deflecting/Crabbing Cavities</td>
<td>135</td>
</tr>
<tr>
<td>MOP0028</td>
<td>Design of CW Superconducting Buncher for RIKEN RI-Beam Factory</td>
<td>138</td>
</tr>
<tr>
<td>MOP0029</td>
<td>Some Design Analysis on the Low-Beta Multi-Spoke Cavities</td>
<td>141</td>
</tr>
<tr>
<td>MOP0030</td>
<td>The sc cw -LINAC Demonstrator - First section of a sc cw -LINAC</td>
<td>144</td>
</tr>
<tr>
<td>MOP0031</td>
<td>Electro-Magnetic Optimization and Analyses of Etching for HIRFL Quarter-Wave Resonators</td>
<td>147</td>
</tr>
<tr>
<td>MOP0032</td>
<td>Development of a Frequency Map for the WIFEL SRF Gun</td>
<td>151</td>
</tr>
<tr>
<td>MOP0033</td>
<td>Design of Superconducting Multi-Spoke Cavities for High-Velocity Applications</td>
<td>154</td>
</tr>
<tr>
<td>MOP0034</td>
<td>Optimized RF Design of 704 MHz $\beta=1$ Cavity for Pulsed Proton Drivers</td>
<td>157</td>
</tr>
<tr>
<td>MOP0035</td>
<td>Structural Mechanical Analysis of Superconducting CH-Cavities</td>
<td>162</td>
</tr>
<tr>
<td>MOP0037</td>
<td>Development of Superconducting CH Cavities</td>
<td>169</td>
</tr>
</tbody>
</table>
MOPO038 – Development of the Demountable Damped Cavity .......................................................... 172
MOPO039 – Low-β Triple Spoke Cavity Design Improvement for Proton Linac ................................. 177
MOPO041 – Conceptual Design of the β = 0.86 Cavities for the Superconducting Linac of ESS ........... 180
MOPO042 – Coupler Design for a Sample Host TE Cavity ................................................................. 184
MOPO043 – Mechanical Study of Superconducting Parallel-Bar Deflecting/Crabbing Cavities .......... 188
MOPO044 – Electromagnetic Design Optimization of a Half-Wave Resonator .................................. 192
MOPO045 – Coupled Electromagnetic and Mechanical Simulations for Half-Wave Resonator Design .... 197
MOPO046 – Electromagnetic Optimization of the FRIB 322 MHz β=0.29 Half Wave Resonator ..... 200
MOPO047 – HOM Cavity Design for the TRIUMF E-LINAC ......................................................... 203
MOPO049 – Electro-Magnetic Optimization of a Quarter-Wave Resonator ....................................... 206
MOPO050 – Design of a 1500 MHz Bunch Lengthening Cavity for NSLS-II ..................................... 210
MOPO051 – Design for Manufacture of a Superconducting Half Wave Resonator β=0.53 ............... 213
MOPO052 – Studies on a Plunger Tuner System for a Double Spoke Cavity .................................... 216
MOPO053 – Designs of Superconducting Parallel-Bar Deflecting Cavities for Deflecting/Crabbing Applications .............................................................. 219
MOPO054 – Superconducting 112 MHz QWR Electron Gun ......................................................... 223
MOPO055 – Superconducting Resonator Production for Ion Linac at Michigan State University ........ 226
MOPO056 – Beam Break Up Studies for Cornell’s Energy Recovery Linac ........................................ 229
MOPO057 – Coupler Kick Studies in Cornell’s 7-Cell Superconducting Cavities ............................... 232
MOPO058 – Analysis of Beam Damage to FRIB Driver Linac ......................................................... 236
MOPO060 – Higher Order Modes for Beam Diagnostics in Third Harmonic 3.9 GHz Accelerating Modules .................................................................................................................. 239
MOPO061 – Effects of Elliptically Deformed Cell Shape in the Cornell ERL Cavity ......................... 244
MOPO062 – BEPCII Superconducting RF System Operation Status .................................................. 247
MOPO063 – HOM Measurements with Beam at the Cornell Injector Cryomodule ......................... 251
MOPO064 – Adaptive Lorentz Force Detuning Compensation in the ILC S1-G Cryomodule at KEK .... 254
MOPO066 – SCREAMm – Modified Code SCREAM to Simulate the Acceleration of a Pulsed Beam Through the Superconducting Linac ................................................................. 258
MOPO067 – CW Measurements of Cornell LLRF System at HoBiCaT ............................................. 262
MOPO068 – Reliability Improvements of the Diamond Superconducting Cavities ............................ 267
MOPO070 – Preliminary Test Results from 650 MHz Single Cell Medium Beta Cavities for Project X .... 271
TUJOA01 – Athmospheric Surface Treatments to SC cavities ......................................................... 275
TUJOA02 – Multilayer Coatings: Opportunities and Challenges. ....................................................... N/A
TUJOA03 – Magnetic Screening of NbN Multilayers Samples ......................................................... 281
TUJOA04 – MgB2 Thin Film Studies .................................................................................................. 287
TUJOA05 – The Superheating Field of Niobium: Theory and Experiment ......................................... 293
TUJOA06 – Deposition of Niobium and Other Superconducting Materials With High Power Impulse Magnetron Sputtering: Concept and First Results ........................................... 302
TUJOB01 – Energetic Condensation Growth of Nb Thin-films ......................................................... 309
TUJOB02 – Summary of the Symposium on Ingot Nb and New Results on Fundamental Studies of Large Grain Nb .................................................................................................................. 319
TUJOB03 – Testing the RF Properties of Novel Super Conducting Materials ................................... 325
TUJOB04 – Muon Spin Rotation/Relaxation Studies of Niobium for SRF applications ..................... N/A
TUJOB05 – New Approaches to Nb Thin Film Coating ................................................................. N/A
TUJOB06 – Nb Films: Substrates, Nucleation & Crystal Growth ..................................................... 332
TUJOB07 – Magnesium Diboride Films for SRF Cavity Applications ............................................. N/A
TUJOB08 – Hot Topic: Medium Field Q-Slope and Paths to High-Q Operation ............................... N/A
TUP0001 – Development of Quality Assurance Procedures for the Fast/Slow Tuners on the 1.3 GHz SRF Cavities for the SRF Accelerator Test Facility at Fermilab ................................................. N/A
TUP0002 – High Power Pulsed Tests of a β=0.5 5-Cell 704 MHz Superconducting Cavity ................. 345
TUP0003 – Cooling Properties of HOM Absorber Model for cERL in Japan .................................... 350
TUP0004 – Development and Testing of Prototype Fundamental Power Couplers for FRIB Half Wave Resonators ................................................................................................................. 353
TUP0005 – High Power Tests of KEK-ERL Input Coupler for Main Linac Under LN2 Condition ....... 356
TUP0006 – High Power Couplers for the Project X Linac ................................................................. 361
TUP0007 – Development of STF Input Couplers for ILC ................................................................... N/A
TUP0008 – Vertical Test Facility for Superconducting RF Cavities at Daresbury Laboratory .......... 365
TUPO009 – How to Eliminate a Copper Coating and to Increase an Average Power of Main Coupler .......... 368
TUPO010 – Conditioning the Fundamental Power Coupler for ERL SRF Gun .................................................. 371
TUPO011 – Coupler Cleaning Machine ............................................................................................................. 374
TUPO012 – Niobium Electropolishing in an Aqueous, Non-Viscous HF-Free Electrolyte: A New Polishing Mechanism ......................................................................................................................... 377
TUPO013 – Assembly of the International ERL Cryomodule at Daresbury Laboratory ................. 382
TUPO014 – High Gradient Results of ICHIRO 9-Cell Cavity in Collaboration With KEK and Jlab ........ 386
TUPO015 – Standard Procedures of ILC High Gradient Cavity Processing at Jefferson Lab ................. 391
TUPO016 – Study Correlating Niobium Surface Roughness with Surface Particle Counts .............. 394
TUPO017 – Development and Scale-Up of an HF Free Electropolishing Process in Single-Cell Niobium SRF Cavities ........................................................................................................................................ 397
TUPO018 – Update of the DESY Infrastructure for Cavity Preparation .......................................................... 401
TUPO019 – Fabrication, Tuning, Treatment and Testing of Two 3.5 Cell Photo-Injector Cavities for the ELBE Linac ......................................................................................................................................................... 405
TUPO021 – Current State of Electropolishing at ANL ....................................................................................... 408
TUPO022 – Effects of Cathode Shapes on BEP and EP During Vertical Surface Treatments on Niobium .......................................................................................................................................................... 411
TUPO023 – Development of the Superconducting Cavity for ILC at TOSHIBA.............................................. 418
TUPO024 – Sulfur Residues in Niobium Electropolishing ................................................................................. 421
TUPO025 – Integrated Cavity Processing Apparatus at Fermilab: SRF Cavity Processing R&D ................ 424
TUPO026 – Nine - Cell Tesla Shape Cavities Produced From Hydroformed Cells ................................ N/A
TUPO027 – A New Home for SRF Work at JLab—the Technology and Engineering Development Facility . N/A
TUPO028 – Qualification of the Second Batch Production 9-Cell Cavities Manufactured by AES and Validation of the First US Industrial Cavity Vendor for ILC .................................................................................. 433
TUPO029 – Gradient Improvement by Removal of Identified Local Defects ................................................. 436
TUPO030 – Status of the 9-Cell Superconducting Cavity R&D for ILC at Hitachi ........................................ 439
TUPO031 – Update on the R&D of Vertical Buffered Electropolishing on Nb Samples and SRF Single Cell Cavities ........................................................................................................................................................................ 442
TUPO032 – Updates on R&D of Nondestructive Inspection Systems for SRF Cavities ......................... 447
TUPO033 – Study of I-V Characteristics at Different Locations Inside a Demountable Nb SRF Cavity During Vertical BEP and EP Treatments ........................................................................................................ 450
TUPO034 – A Flexible System for the High Pressure Rinsing of SRF Cavities ............................................ 456
TUPO035 – Cryogenic Test of a Two-Cell Passive SRF Cavity for NSLS-II ....................................................... N/A
TUPO036 – Material for European XFEL Resonators ..................................................................................... N/A
TUPO037 – Study on Electro-Polishing Process by Niobium-Plate Sample With Artificial Pits ................ 461
TUPO038 – Superconducting RF Cavity Development With UK Industry ....................................................... 464
TUPO041 – Investigation on Cavity String Assembly and Repair ................................................................. 472
TUPO042 – SLAC/FNAL TTF3 Coupler Assembly and Processing Experience .............................................. 476
TUPO043 – Optimization of Ar/CL2 Plasma Parameters Used for SRF Cavity Etching ......................... 479
TUPO044 – Correction of a Superconducting Cavity Shape Due to Etching, Cooling Down and Tuning .... 482
TUPO045 – Investigations to Understand the Origin of Degradation of Super Conducting Cavities found in Acceleration Modules at DESY ................................................................................................................. 486
TUPO046 – Results on Large Grain Nine-Cell Cavities at DESY: Gradients up to 45 MV/m after Electropolishing ......................................................................................................................................................... 490
TUPO048 – Commissioning and Upgrade of Automatic Cavity Tuning Machines for the European Xfel .... 495
TUPO049 – Q0 Improvement of Large-Grain Multi-Cell Cavities by Using JLab’s Standard ILC EP Processing ......................................................................................................................................................... 501
TUPO050 – Studies on Transportation of Superconducting Resonators and Beam Position Monitors - Quadrupol Units for the XFEL Project .............................................................................................................. 504
TUPO051 – High-Temperature Heat Treatment Study on a Large-Grain Nb Cavity ......................................... 508
TUPO052 – Fabrication and Test of 500MHz Nb Cavity for BEPCII ................................................................. 512
TUPO053 – Optical Inspection of SRF Cavities at Fermilab ............................................................................. 515
TUPO054 – SRF Cavity Surface Topography From Optical Inspection .............................................................. 519
TUPO055 – Horizontal SRF Cavity Testing at Fermilab ..................................................................................... 522
TUPO057 – Buffered Chemical Polishing Development for the $\beta=0.53$ Half-Wave Resonator at Michigan State University ......................................................................................................................................................... 526

Contents vii
TUPO058 – CERN SRF Assembling and Test Facilities .............................................. 530
TUPO059 – SRF Cavity Processing and Cleanroom Facility Upgrades at Michigan State University ....... 533
TUPO060 – Dewar Testing of $\beta = 0.085$ Quarter Wave Resonators at MSU ................................ 537
TUPO061 – Preparation and Testing of the SRF Cavities for the CEBAF 12 GeV Upgrade .................. 542
TUPO062 – Vertical Electro-Polishing at CEA Saclay: Commissioning of a New Set-Up and Modeling of the Process Applied to Different Cavities .................................................. 549
TUPO065 – Economical Manufacture of Seamless High-Purity Niobium .................................... 555
TUPO066 – Analysis of Recent Results from Second Sound, Temperature Mapping and Optical Inspection of 1.3 GHz Cavities at DESY .......................................................... 558
WEIOA01 – Quantitative EP Studies and Results for SRF Nb Cavity Production .............................. 563
WEIOA02 – Centrifugal Barrel Polishing (CBP) of SRF Cavities Worldwide ................................. 571
WEIOA03 – A New Electropolishing System For Low-Beta SC Cavities ........................................ 576
WEIOA04 – Review of RF - Sample - Test Equipment and Results ............................................. 579
WEIOA05 – X-Ray Tomography Inspection of SRF Cavities ...................................................... 588
WEIOA06 – Effect of Heat Treatment Temperature on the Thermal Conductivity of Large Grain Superconducting Niobium ................................................................. 593
THIOA01 – Test Results of the International S1-Global Cryomodule ............................................. 615
THIOA02 – Gradient R&D in the US .................................................................................. 625
THIOA03 – Compact Superconducting Cavities for Deflecting and Crabbing Applications ............. 631
THIOA04 – QWR for $\beta \sim 1$ Accelerators ........................................................................ 637
THIOA05 – The sc cw-LINAC Demonstrator - SRF-Technology finds the way into GSI .................. 646
THIOA06 – Mechanical Design Considerations for $\beta =1$ Cavities ........................................... 650
THIOA07 – Single-cell SC Cavity Development in India ........................................................... 659
THIOB01 – Project X Cavity and Cryomodule Development ...................................................... 663
THIOB02 – Vertical Tests Results of the IFMIF Cavity Prototypes and Cryomodule Development .... 667
THIOB03 – Status of the ReAccelerator Facility ReA for Rare Isotopes ........................................... 674
THIOB04 – SRF Advances for ATLAS and other $\beta <1$ Applications ......................................... 680
THIOB05 – SPL Cavity Development .................................................................................. 684
THIOB06 – Recents Developments in SRF at TRIUMF ........................................................... 695
THIOB07 – HIE-ISOLDE quarter wave Nb/Cu cavity ............................................................... 695
THIOB08 – Hot topics: Recipes for 9-cell cavity fabrication and preparation ................................... 695
THPO001 – Quench Simulation Using a Ring-Type Defect Model ................................................ 687
THPO003 – Multipacting in HOM Couplers at the 1.3GHz 9-cell TESLA Type SRF Cavity .......... 691
THPO004 – Electro- or Chemical- Polishing and UHV Baking of Superconducting rf Nb Cavities and Q(H) Dependencies ................................................................. 695
THPO005 – Exploration of Very High Gradient Cavities ............................................................ 698
THPO006 – Study of Trapped Magnetic Flux in Superconducting Niobium Samples ..................... 702
THPO007 – Novel Deflecting Cavity Design for eRHIC ................................................................ 707
THPO008 – Post-Baking Losses in Niobium Cavities Studied by Dissection ................................. 710
THPO009 – Quench Studies in Large and Fine Grain Nb Cavities .............................................. 714
THPO010 – Multipactor Studies for DIAMOND Storage Ring Cavities ....................................... 718
THPO011 – Improving the Intrinsic Quality Factor of SRF Cavities by Thermal Cycling ............. 724
THPO012 – Influence of Foreign Particles on the Quality Factor of a Superconducting Cavity ....... 728
THPO013 – Investigation of 9-Cell Cavity Performance Problem by Facilities in KEK AR East 2nd Experimental Hall .................................................................................... 733
THPO015 – Repair SRF Cavity by Re-Melting Surface Defects via High Power Laser Technique .. 740
THPO016 – Preliminary Results on the Laser Heating Investigation of Hotspots in a Large-Grain Nb Cavity .............................................................................................. 746
THPO018 – Quench Studies of ILC Cavities .................................. 750
THPO020 – Exploration of Quench Initiation Due to Intentional Geometrical Defects in a High Magnetic Field Region of an SRF Cavity ................................ 759
THPO023 – External Magnetic Fields and Operating SRF Cavity .................................. N/A
THPO024 – Quench Dynamics in SRF Cavities .................................. 764
THPO026 – Second Sound Measurement for SPL Cavity Diagnostics .................................. 767
THPO027 – Optical Observation of Geometrical Features and Correlation With RFT Test Results ........ 773
THPO028 – SIMS and TEM Analysis of Niobium Bicrystals .................................. 776
THPO029 – Commissioning Cornell OSTs for SRF Cavity Testing at JLab .................. 781
THPO030 – Microphonic Compensation for a 325MHz Single Spoke Cavity at Fermilab ........ 781
THPO031 – Second Sound as an automated Quench Localisation Tool at DESY ......... 785
THPO032 – TOF-SIMS Analysis of Hydrogen in Niobium, From 160°K to 475°K .......... 789
THPO034 – Vertical Test Results on KEK-ERL 9-Cell L-Band Superconducting Cavity .... 795
THPO035 – Comparison of Field Emission at Different SRF Cavity Assembly States and Test Stands ...... 796
THPO036 – A Machine for High-Resolution Inspection of SRF Cavities at JLab .......... 798
THPO037 – Lorentz Force Detuning Compensation in Fermilab Cryomodule 1 ... N/A
THPO038 – Detailed Nb Surface Morphology Evolution During Electropolishing for SRF Cavity Production .......... 802
THPO040 – A Wire Position Monitor System for the 1.3GHz Tesla-Style Cryomodule at the Fermilab New Muon Lab ........................................ 806
THPO041 – HOM Identification and Bead Pulling on the Brookhaven ERL .......... 810
THPO042 – Crystallographic Orientation of Epitaxial Transition Observed for Nb (BCC) on Cu and MgO (FCC) Single-Crystals .................................. N/A
THPO044 – Structural Characterization of Nb Films Deposited by ECR Plasma Energetic Condensation on Crystalline Insulators ........................................ 819
THPO045 – MgB2 Nonlinear Properties Investigated Under Localized High RF Magnetic Field Excitation .... 826
THPO046 – Characterization of Scale-Dependent Roughness of Niobium Surfaces as a Function of Surface Treatment Processes .................................. 832
THPO047 – Strain Effects in the Superconducting Properties of Niobium Thin Films grown on Sapphire .......... 835
THPO048 – RF Surface Impedance of MgB2 Thin Films at 7.5 GHz .................................. 838
THPO050 – TE Sample Host Cavities Development at Cornell .................................. 841
THPO051 – Laser Re-Melting Influence on Nb Properties: Geometrical and Chemical Aspects ........ 846
THPO052 – Investigation of Near-Surface Interstitial Hydrogen in Cavity-Grade Niobium ........ 849
THPO053 – Material for Fabrication of DESY Large Grain/Single Crystal Cavities .......... N/A
THPO055 – Investigation of Samples Separated From Prototype Cavities of the European XFEL .......... N/A
THPO057 – Superconducting DC and RF Properties of Ingot Niobium ................ 856
THPO058 – Phase-Sensitive Nonlinear Near-Field Microwave Microscopy on MgB2 Thin Films .......... N/A
THPO059 – Correlation of Microstructure, Chemical Composition and RRR-Value in High Purity Niobium (Nb-RRR)) ........................................ 863
THPO060 – First Principles Investigation of Hydrogen in Niobium .................................. N/A
THPO061 – Activation of Field Emitters on Clean Nb Surfaces .................................. 869
THPO062 – Investigation of Epitaxial Niobium Thin Films Grown on Different Surfaces Suitable for SRF Cavities ........................................ 874
THPO064 – Structural Properties of Niobium Thin Films Deposited on Metallic Substrates by ECR Plasma Energetic Condensation ........................................ 877
THPO065 – Anomalous Morphological Scaling in Epitaxial Niobium Thin Films on MgO(001) ........ 883
THPO066 – Stoichiometric Nb3Sn in First Samples Coated at Cornell ................. 886
THPO067 – Characterization of Large Grain Nb Ingot Microstructure Using OIM and Laue Methods ...... 890
THPO069 – Nb Film Growth on Crystalline and Amorphous Substrates ................. 898
THPO070 – Effect of Fabricate Condition on Properties of Bi-2212 Thin Films .......... 905
THPO071 – Detailed Surface Analysis of Incremental Centrifugal Barrel Polishing (CBP) of Single-Crystal Niobium Samples ........................................ 908
THPO072 – Raman Spectroscopy as a Probe of Surface Oxides and Hydrides on Niobium .......... 912
THPO073 – Laser Melt Smoothing of Niobium Superconducting Radio-Frequency Cavity Surfaces .......... 917
THPO074 – SRF Multilayer Structures based on NbTiN ........................................ 920
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>THPO076 – Measurement of the Loss Tangent and Heat Capacity of a Large Single Crystal Sapphire</td>
<td>926</td>
</tr>
<tr>
<td>THPO077 – Mo-Re Films for SRF Applications</td>
<td>930</td>
</tr>
<tr>
<td>THPO079 – Surface Preparation of Metallic Substrates for Quality SRF Thin Films</td>
<td>936</td>
</tr>
<tr>
<td>FROIA01 – Adaptive Compensation for Lorentz Force Detuning in Superconducting RF Cavities</td>
<td>940</td>
</tr>
<tr>
<td>FROIA02 – Innovative Tuner Designs For Low Beta SRF Cavities</td>
<td>943</td>
</tr>
<tr>
<td>FROIA03 – Recent Progress in HOM Damping from Around The World</td>
<td>N/A</td>
</tr>
<tr>
<td>FROIA04 – Power Couplers for Spiral-2</td>
<td>947</td>
</tr>
<tr>
<td>FROIA05 – Overview of CW Input Couplers for ERL</td>
<td>951</td>
</tr>
<tr>
<td>FROIA06 – Construction of cERL Cryomodules for Injector and Main Linac</td>
<td>956</td>
</tr>
<tr>
<td>FROIA07 – SRF Photoinjector Tests at HoBiCat</td>
<td>962</td>
</tr>
<tr>
<td>FROIB01 – SRF Activities at Peking University</td>
<td>969</td>
</tr>
<tr>
<td>FROIB02 – STATUS OF THE DC-SRF PHOTONJECTOR FOR PKU-SETF</td>
<td>973</td>
</tr>
<tr>
<td>FROIB03 – Chinese Plan for ADS and CSNS</td>
<td>977</td>
</tr>
<tr>
<td>FROIB04 – SRF Accelerator for Indian ADS Program: Present &amp; Future Prospects</td>
<td>983</td>
</tr>
<tr>
<td>FROIB05 – Crab Crossing for LHC Upgrade</td>
<td>988</td>
</tr>
<tr>
<td>FROIB06 – The ESS Accelerator</td>
<td>994</td>
</tr>
</tbody>
</table>

**Appendices**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of Authors</td>
<td>999</td>
</tr>
<tr>
<td>Institutes List</td>
<td>1009</td>
</tr>
</tbody>
</table>