HEPAP

June 24, 2011

ACCELERATOR SCIENCE

@ Cornell Laboratory for Accelerator-baSed Sciences and Education (*CLASSE)*

Primary Support from NSF with significant DOE Support

Also important support from CU and NYS

PLAN

- R&D Categories in Play Now (2010-2011)
- Examples
- Publications
- Collaborations
- People

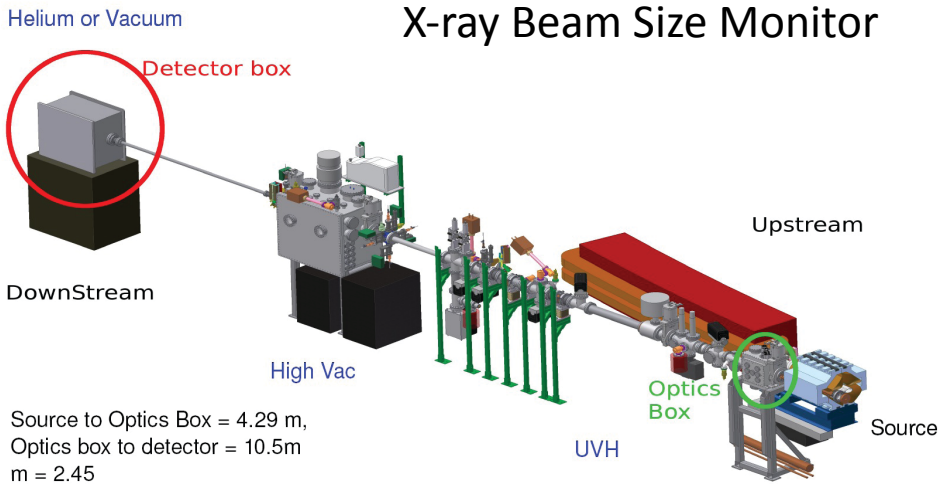
R&D

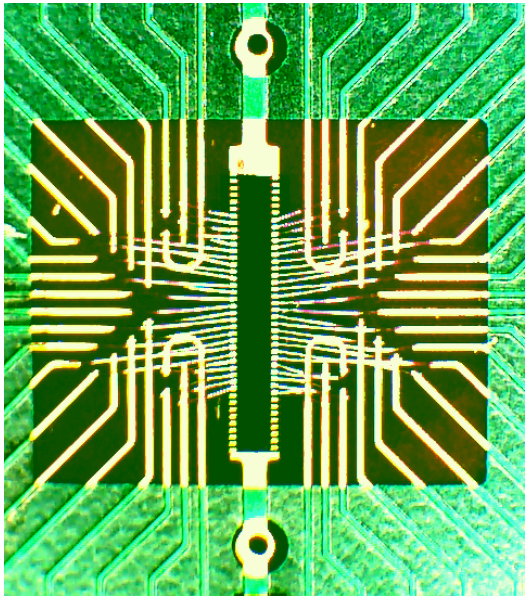
- Damping Rings
  - Electron cloud physics
  - Electron cloud mitigation
  - Low emittance tuning
  - Instrumentation
- CW Linacs
  - High brightness, space charge dominated beams
  - High current, low emittance guns + photocathodes
- Superconducting RF (SRF)
  - fundamental limits
  - new materials
  - high performance cavities
  - breakdown rate
- Theory
  - Simulations
  - Analysis

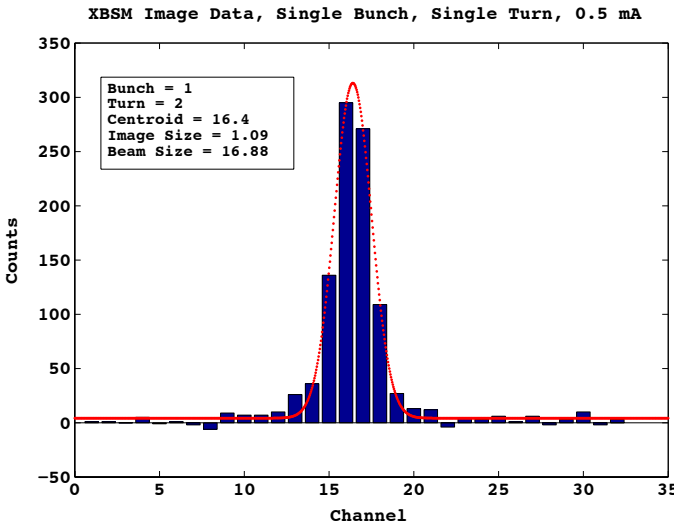
Examples

Damping Rings Related

X-ray Beam Size Monitor



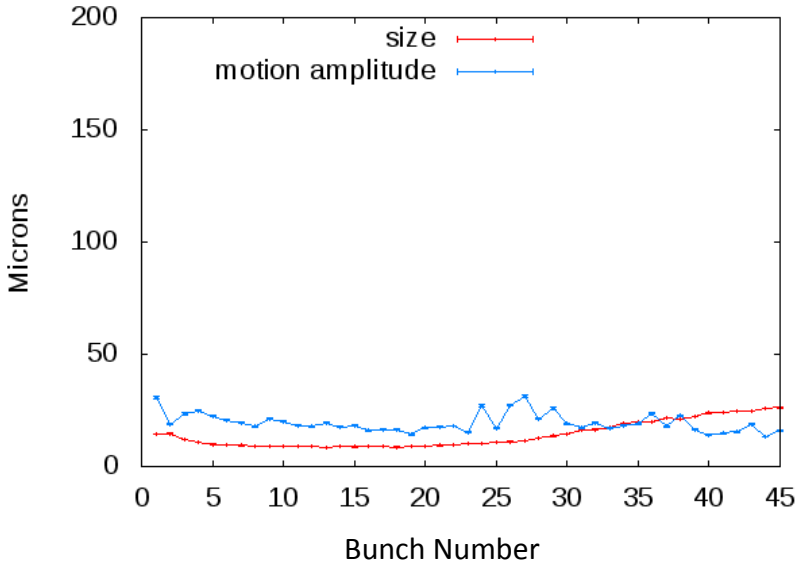




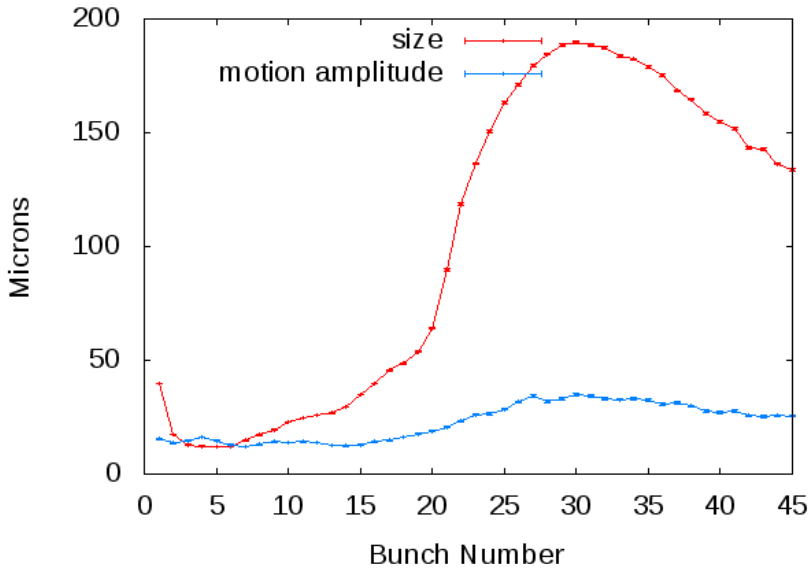
The detector is a vertical array of 32 InGaAs diodes with pitch 50µm and horizontal width 400µm. The InGaAs layer is 3.5 µm thick, which absorbs 73% of photons at 2.5keV; there is a 160nm Si_3N_4 passivation layer. The time response of the detector is sub-nanosecond.

e-cloud instability illustrated – beam size vs bunch number in the train of 45 bunches

0.8×10^{10} e/bunch



2×10^{10} e/bunch



Left panel below e-cloud threshold, right panel above.

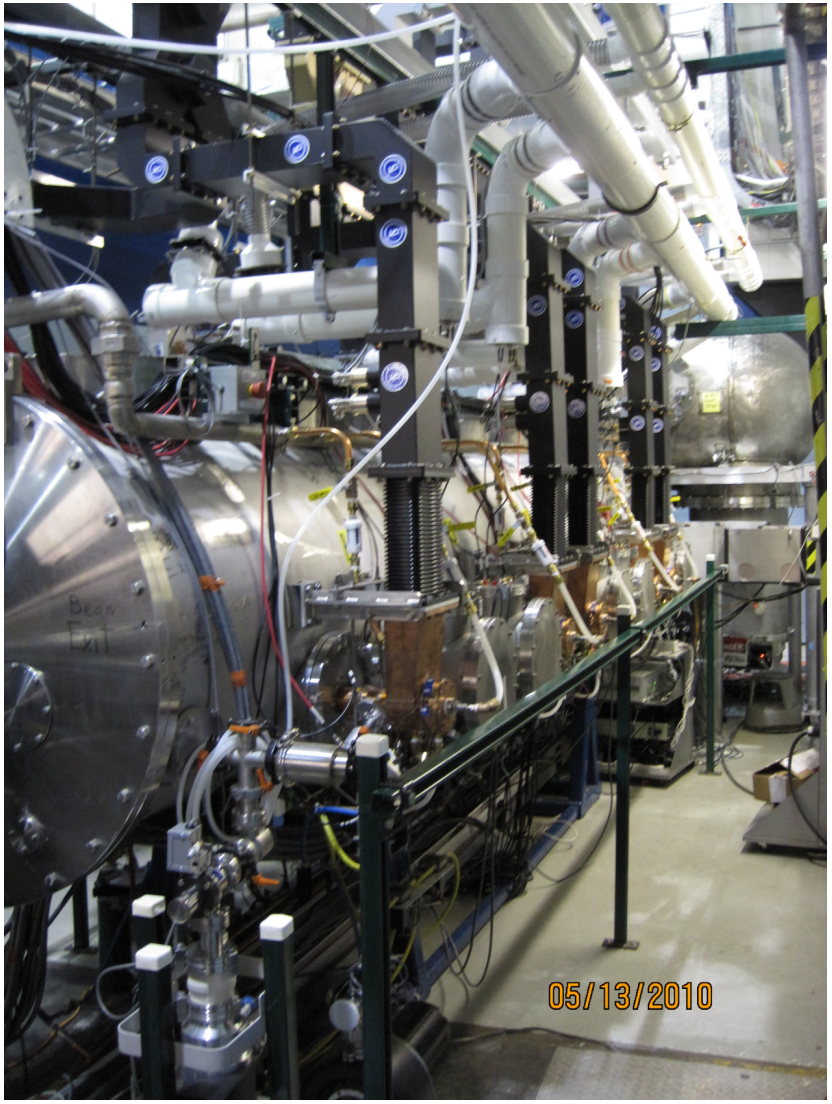
Mitigation Explorations

	Drift	Quad	Dipole	Wiggler	VC Fab
Al	✓	✓	✓		CU, SLAC
Cu	✓			✓	CU, KEK, LBNL, SLAC
TiN on Al	✓	✓	✓		CU, SLAC
TiN on Cu	✓			✓	CU, KEK, LBL, SLAC
Amorphous C on Al	✓				CERN, CU
NEG on SS	✓				CU
Diamond-like C on Al	✓				CU, KEK
Solenoid Windings	✓				CU
Fins w/TiN on Al	✓				SLAC
Triangular Grooves on Cu				✓	CU, KEK, LBL, SLAC
Triangular Grooves w/TiN on Al			✓		CU, SLAC
Triangular Grooves w/TiN on Cu				✓	CU, KEK, LBL, SLAC
Clearing Electrode				✓	CU, KEK, LBL, SLAC

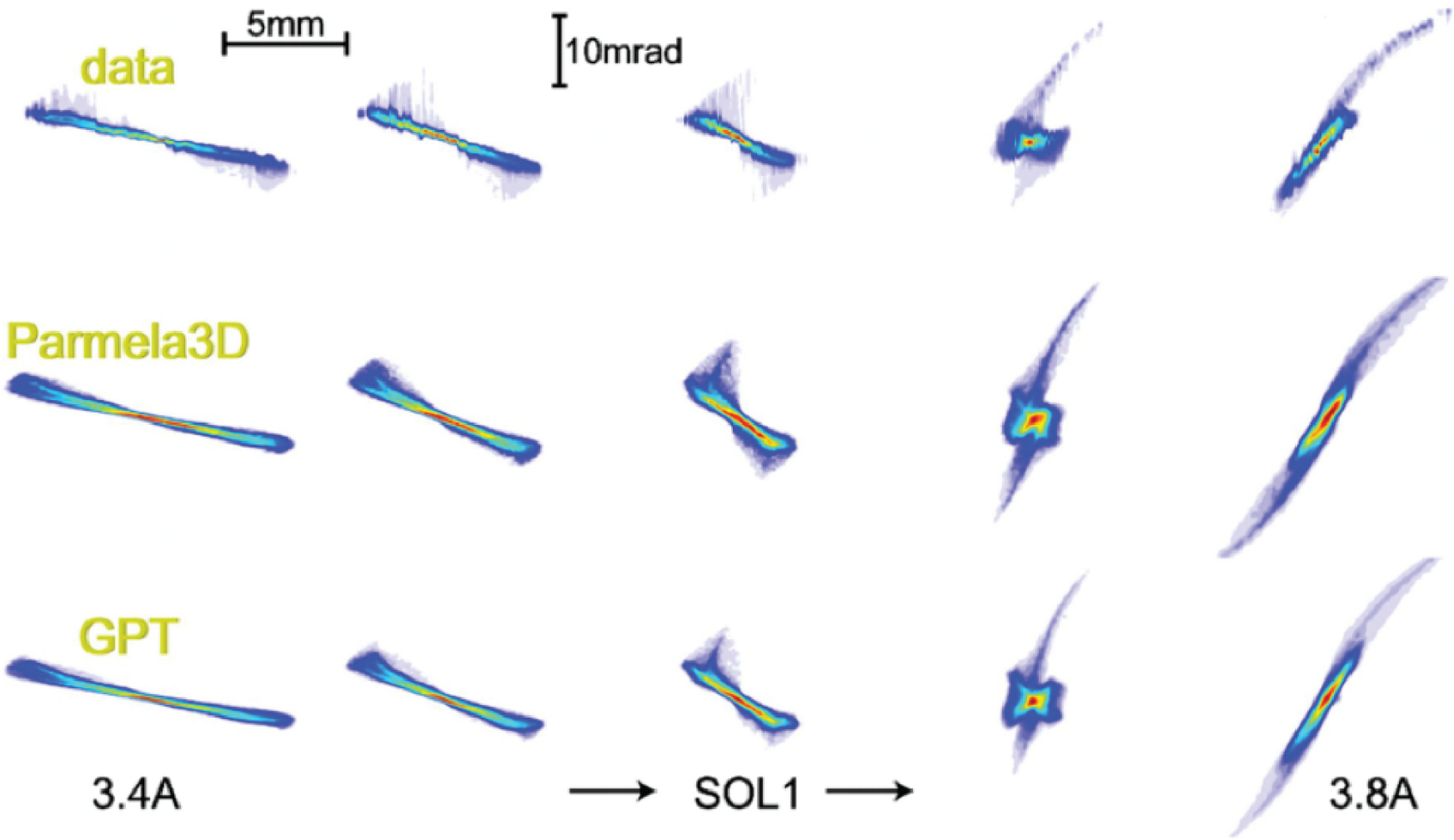
Examples

CW Linacs

1. 5 MeV 100 mA Superconducting Test Accelerator for Space Charge and Emittance Studies



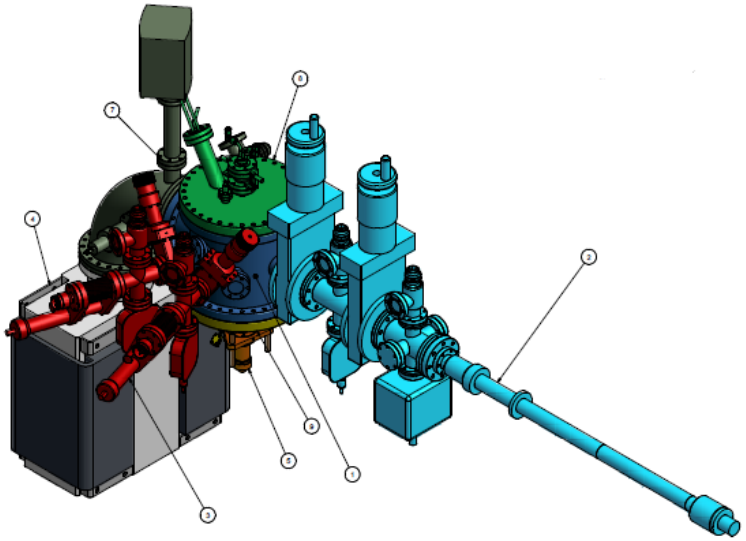
2. Transport of Space Charge Dominated Beams



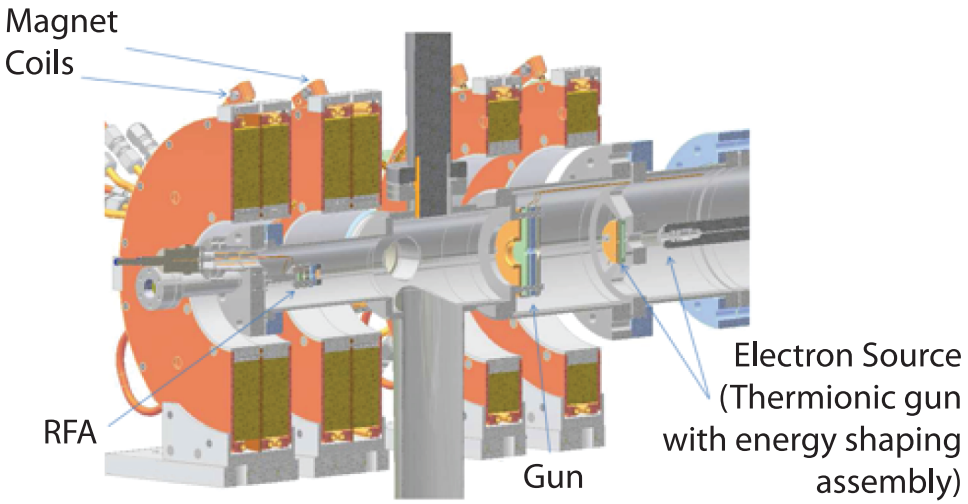
Color comparison of measured and simulated vertical transverse phase space distributions for 80 pC bunches at z = 1.244 m. Data representing measurements, PARMELA3D, and GPT calculations are arranged in rows with different strength of the solenoid lens corresponding to column position.

3. Program aimed at better materials with low thermal emittance, high longevity, high QE

Multi Alkali Growth Chamber



Electron Energy Analyzer



- Grow / procure new materials
- Evaluate actual performance in test accelerator
- Theoretical modeling and properties characterization

8 – peer reviewed photocathode papers over 2008-2011

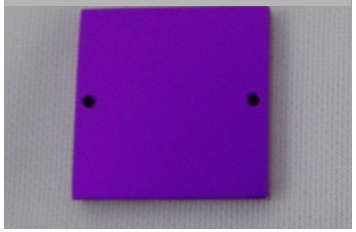
Examples

Superconducting RF

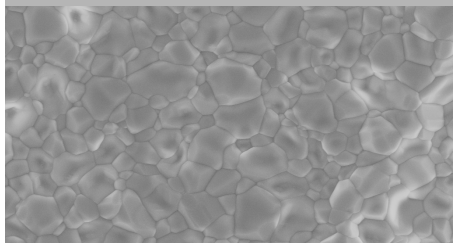
Three Student SRF Projects

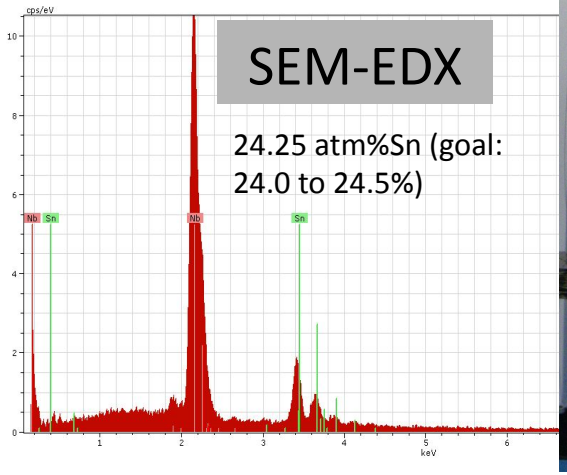
Nb_3SN work towards 100 MV/m in SRF cavities

Anodization



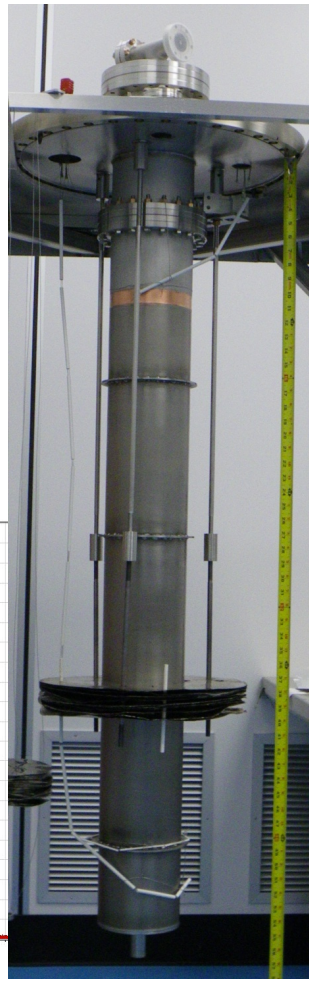
SEM



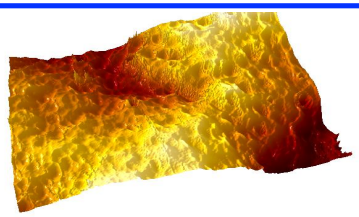
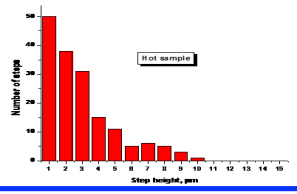
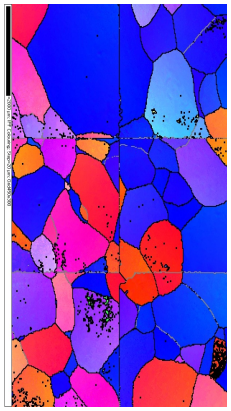
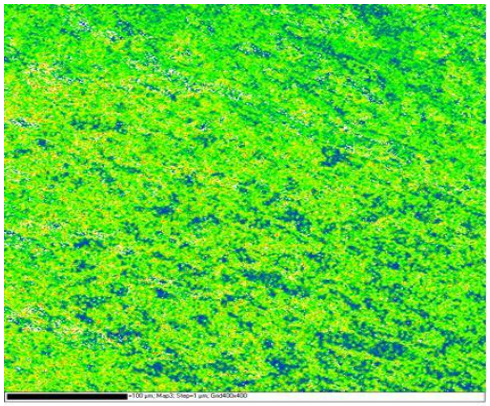
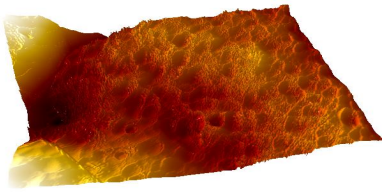
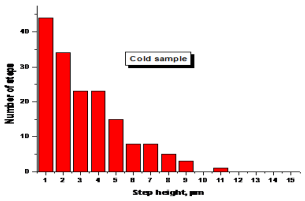
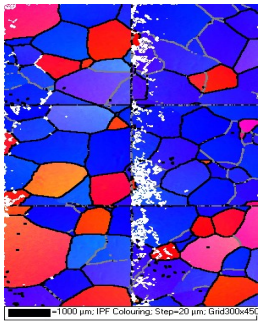
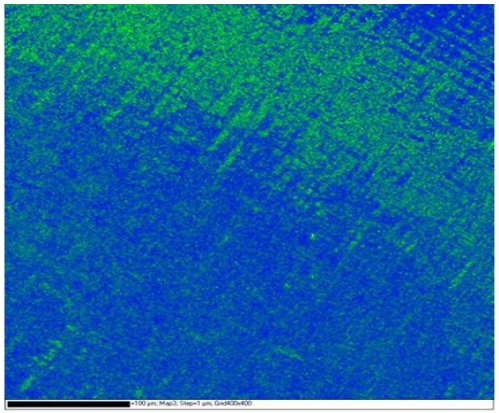


SEM-EDX

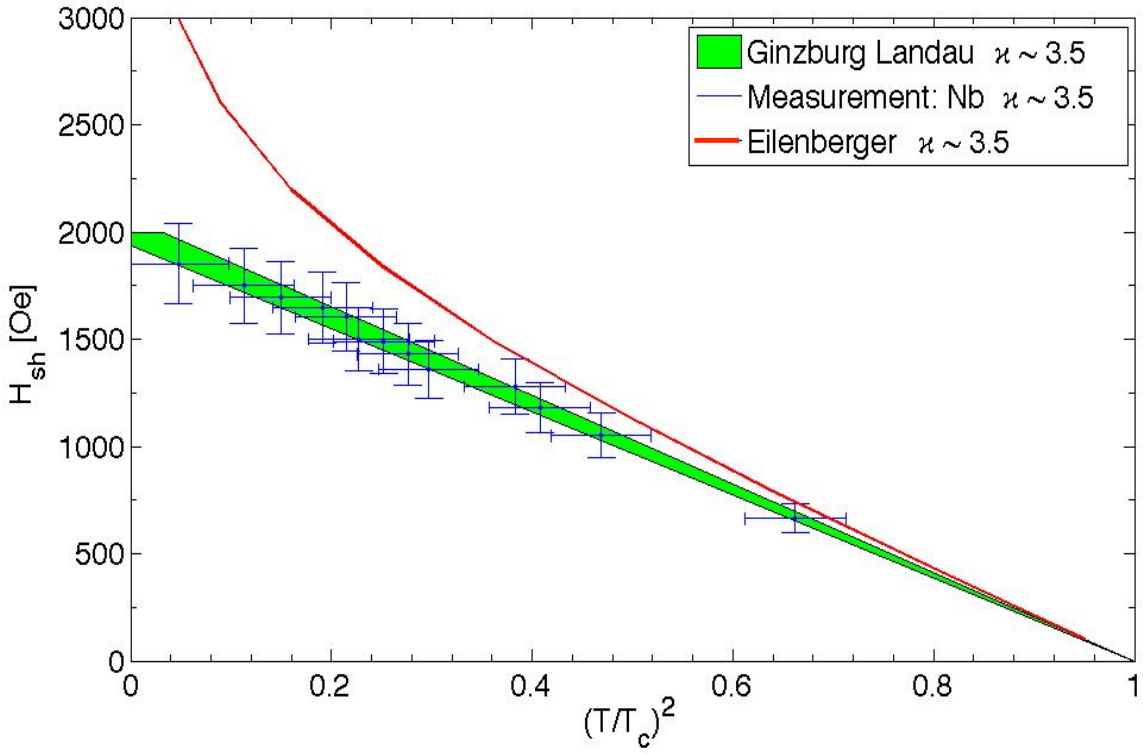
24.25 atm%Sn (goal: 24.0 to 24.5%)



RF surface resistance dependence in SRF cavities

	Surface roughness	Grain orient.	Dislocation density
Area with high losses	 		
Area with low losses	 		

RF critical field / superheating field studies



Publications (2010-2011)

Damping Rings Related

- ✓ 47 tot (Details in Appendix I)
  - 26 PAC
  - 17 ICFA Beam Dynamics Workshop on e-Cloud
  - 3 PRST-AB
  - 1 Jpn. J. Appl. Ph

CW Linacs

- ✓ 11 tot
  - 1 PRL
  - 2 Appl. Phys. Lett
  - 1 J. Appl. Phys.
  - 4 IPAC10
  - 2 LINAC10
  - 1 PAC 11

SRF

- ✓ 11 tot
  - 4 PAC11
  - 4 IPAC10
  - 2 LINAC10
  - 1 arXiv:1002.3812.v1
  - [4 submitted to PRST AB; 3 to IPAC11]

Theory

- ✓ 6 (2009-2010)
  - 2 PRST AB
  - 2 PAC09
  - 2 IPAC10

Collaborations

- Damping Rings CesrTA

- CW Linacs
  - FNAL
  - JLab
  - Daresbury (STFC) + Cu +[Rossendorf, Stanford, LBNL]
  - KEK
  - HZB

- SRF
  - TTC 56 institutions in 12 countries

Members of the TESLA Technology Collaboration, TTC

Status: 24.05.07

- CANDLE, Yerevan
- Yerevan Physics Institute, YerPhI, Yerevan

- TRIUMF, Canada's National Laboratory for Particle and Nuclear Physics

- Institute for High Energy Physics, IHEP, Academia Sinica, Beijing
- Tsinghua University, Beijing
- Peking University

- CEA/DSM DAPNIA, CE-Saclay, Gif-sur-Yvette
- Laboratoire de l'Accélérateur Linéaire, LAL, IN2P3-CNRS

- Berliner Elektronenspeicherring-Gesellschaft für Synchrotronstrahlung, BESSY, Berlin
- Hahn-Meitner Institut, HMI, Berlin
- Technische Universität Darmstadt
- Universität Frankfurt am Main
- GKSS-Forschungszentrum Geesthacht
- Deutsches Elektronen-Synchrotron DESY in der Helmholtz-Gemeinschaft, Hamburg und Zeuthen
- Universität Hamburg
- Forschungszentrum Rossendorf
- Universität Rostock
- Bergische Universität-GH Wuppertal

- CCLRC-Daresbury Laboratory / ASTeC Department*
- Royal Holloway, University of London, RHUL / JAI
- University College London, UCL
- University of Oxford / JAI

- Raja Ramanna Centre of Advanced Technology RRCAT, Indore
- Bhabha Atomic Research Centre BARC, Mumbai
- Inter-University Accelerator Centre, IUAC & Delhi University, DU

- Laboratori Nazionali di Frascati, INFN, Frascati
- Istituto Nazionale di Fisica Nucleare, INFN, Legnaro
- Istituto Nazionale di Fisica Nucleare, INFN, Milan
- Istituto Nazionale di Fisica Nucleare, INFN, Rome II
- Sincrotrone Trieste

- High Energy Accelerator Research Organisation, KEK

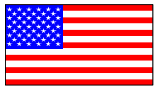
- The Henryk Niewodniczanski Inst. of Nuclear Physics, Polish Academy of Sciences, Krakow
- AGH - University of Science and Technology, Faculty of Physics and Applied Computer Science, Krakow
- The Andrzej Soltan Institute for Nuclear Studies – IPJ, Otwock-Swierk
- Institute of High Pressure Physics, Polish Academy of Sciences, Warsaw
- Warsaw University, Department of Physics
- TU Lodz, Department of Microelectronics and Computer Science
- Warsaw University of Technology, WUT, ISE

Members of the TESLA Technology Collaboration, TTC

Status: 24.05.07

- Moscow Engineering and Physics Institute, MEPhI, Moscow
- Budker Institute for Nuclear Physics BINP, Novosibirsk
- Institute for High Energy Physics IHEP, Protvino
- Institute for Nuclear Research, INR, Russian Academy of Sciences, Moscow

---



- Argonne National Laboratory, ANL, Argonne IL
- Brookhaven National Laboratory, BNL
- Fermi National Accelerator Laboratory, FNAL, Batavia IL
- Cornell University, Ithaca NY
- Jefferson Lab, Newport News VA
- SLAC, ILC Division
- Lawrence Berkeley National Laboratory, LBNL, Berkeley CA
- Michigan State University (MSU)
- Spallation Neutron Source (SNS)

- Joint Institute for Nuclear Research, JINR, Dubna

PEOPLE

- ✧ 5 Faculty in accelerator currently (1 more on phased retirement)
- ✧ During the CLEO era ~ 1 PhD per year in accelerator
- ✧ Rate will ~ double: current enrolment 12 PhD students
- ✧ ~50% grads to Accelerator Labs (US & abroad); 40% industry; 10% academe

APPENDIX 1

2011

C. M. Celata, "Electron Cloud Dynamics in the Cornell Electron Storage Ring Test Accelerator Wiggler," *Phys. Rev. ST Accel. Beams* **14**, April 2012, 041003.

J. R. Calvey, J. A. Crittenden, G. F. Dugan, M. A. Palmer, M. Furman, K. Harkay, "Methods for Quantitative Interpretation of Retarding Field Analyzer Data," in *Proceedings of the 2011 Particle Accelerator Conference, New York, NY*, in press,

S. De Santis, J. Byrd, J. Sikora, J. Calvey, J. Livezey, K. Sonnad, K. Hammond, "TE Wave Measurements of the Electron Cloud in a Dipole Magnetic Field," in *Proceedings of the 2011 Particle Accelerator Conference, New York, NY*, in press,

N. T. Rider, J. P. Alexander, J. A. Dobbins, M. G. Billing, R. E. Meller, M. A. Palmer, D. P. Peterson, C. R. Strohman, J. W. Flanagan, "Development of an X-Ray Beam Size Monitor with Single Pass Measurement Capability for CesrTA ," in *Proceedings of the 2011 Particle Accelerator Conference, New York, NY*, in press,

Joe Conway, Y. Li, X. Liu, V. Medjidzade, M. Palmer, "Implementation and Operation of Electron Cloud Diagnostics for CesrTA ," in *Proceedings of the 2011 Particle Accelerator Conference, New York, NY*, in press,

J. Kim, D. Asner, J. Conway, S. Greenwald, Y. Li, V. Medjidzade, T. Moore, M. Palmer, C. Strohman, "In-Situ Secondary Electron Yield Measurement System at CesrTA ," in *Proceedings of the 2011 Particle Accelerator Conference, New York, NY*, in press,

J. Shanks, M. Billing, R. Meller, M. Palmer, M. Rendina, D. Rubin, N. Rider, D. Sagan, C. Strohman, Y. Yanay, "Status of Low Emittance Tuning at CesrTA ," in *Proceedings of the 2011 Particle Accelerator Conference, New York, NY*, in press,

D. L. Kreinick, J. A. Crittenden, G. Dugan, M. A. Palmer, G. Ramirez, R. L. Holtzapple, M. Randazzo, M. A. Furman, M. Venturini, "Application of Coherent Tune Shift Measurements to the Characterization of Electron Cloud Growth," in *Proceedings of the 2011 Particle Accelerator Conference, New York, NY*, in press,

K. G. Sonnad, K. Butler, G. Dugan, M. A. Palmer, M. T. F. Pivi, "Simulation of Electron Cloud Induced Instabilities and Emittance Growth for CesrTA ," in *Proceedings of the 2011 Particle Accelerator Conference, New York, NY*, in press,

J. A. Crittenden, D. C. Sagan, K. G. Sonnad, "Electron Cloud Modeling for the ILC Damping Rings," in *Proceedings of the 2011 Particle Accelerator Conference, New York, NY*, in press, PDF (PAC 2011/BNL)

J. A. Crittenden, Y. Li, X. Liu, M. A. Palmer, J. P. Sikora, S. Calatroni, G. Rumolo, "Electron Cloud Modeling Results for Time-Resolved Shielded Pickup Measurements at CesrTA ," in *Proceedings of the 2011 Particle Accelerator Conference, New York, NY*, in press,

M. G. Billing, G. Dugan, M. J. Forster, R. E. Meller, M. A. Palmer, G. A. Ramirez, K. Sonnad, J. P. Sikora, H. A. Williams, R. L. Holtzapple, "Measurement Techniques to Characterize Instabilities Caused by Electron Clouds," in *Proceedings of the 2011 Particle Accelerator Conference, New York, NY*, in press,

J. P. Sikora, M. G. Billing, J. A. Crittenden, Y. Li, M. A. Palmer, S. DeSantis , "Time Resolved Measurement of Electron Clouds at CesrTA Using Shielded Pickups," in *Proceedings of the 2011 Particle Accelerator Conference, New York, NY*, in press,

Hyunchang Jin, Moohyun Yoon, Kazuhito Ohmi, John W. Flanagan, Mark A. Palmer, "Electron Cloud Effects in Cornell Electron Storage Ring Test Accelerator and International Linear Collider Damping Ring," *Jpn. J. Appl. Phys.* **50**, February 2011, 026401.

2010

D. Rubin, “CesrTA Program Overview,” in *Proceedings of ECLOUD 2010: 49th ICFA Advanced Beam Dynamics Workshop on Electron Cloud Physics, Ithaca, NY*, edited by K. Smolenski, in press, Paper OPR06.

J. R. Calvey, J. Makita, M. A. Palmer, R. M. Schwartz, C. R. Strohman, S. Calatroni, G. Rumolo, K. Kanazawa, Y. Suetsugu, M. Pivi, L. Wang, “Electron Cloud Mitigation Investigations at CESR-TA,” in *Proceedings of ECLOUD 2010: 49th ICFA Advanced Beam Dynamics Workshop on Electron Cloud Physics, Ithaca, NY*, edited by K. Smolenski, in press, Paper MIT01.

G. Dugan, M. G. Billing, R. Meller, M. Palmer, G. A. Ramirez, J. Sikora, K. Sonnad, H. Williams, R. L. Holtzapple, “Studies of Electron-Cloud-Induced Beam Dynamics at CesrTA ,” in *Proceedings of ECLOUD 2010: 49th ICFA Advanced Beam Dynamics Workshop on Electron Cloud Physics, Ithaca, NY*, edited by K. Smolenski, in press, Paper DYN03.

K. Ohmi, H. Jin, Y. Susaki, “Electron Cloud Instability in Low Emittance Rings,” in *Proceedings of ECLOUD 2010: 49th ICFA Advanced Beam Dynamics Workshop on Electron Cloud Physics, Ithaca, NY*, edited by K. Smolenski, in press, Paper DYN05.

Y. Li, X. Liu, V. Medjidzade, Joe Conway, Mark Palmer, “Implementation and Operation of Electron Cloud Diagnostics for CesrTA ,” in *Proceedings of ECLOUD 2010: 49th ICFA Advanced Beam Dynamics Workshop on Electron Cloud Physics, Ithaca, NY*, edited by K. Smolenski, in press, Paper PST01.

N. T. Rider, J. P. Alexander, M. G. Billing, C. Connoly, N. Eggert, E. Fontes, W. Hopkins, B. Kreis, A. Lyndaker, R. E. Meller, M. A. Palmer, D. P. Peterson, M. C. Rendina, P. Revesz, D. L. Rubin, J. Savino, R. Seeley, J. Shanks, C. R. Strohman, R. L. Holtzapple, J. W. Flanagan, “Bunch-by-Bunch Instrumentation Upgrades for CESR, Based on Requirements for the CESR Test Accelerator Research Program,” in *Proceedings of ECLOUD 2010: 49th ICFA Advanced Beam Dynamics Workshop on Electron Cloud Physics, Ithaca, NY*, edited by K. Smolenski, in press, Paper PST02.

J. R. Calvey, J. A. Crittenden, G. F. Dugan, M. A. Palmer, K. Harkay, “Methods for Quantitative Interpretation of Retarding Field Analyzer Data,” in *Proceedings of ECLOUD 2010: 49th ICFA Advanced Beam Dynamics Workshop on Electron Cloud Physics, Ithaca, NY*, edited by K. Smolenski, in press, Paper PST03.

J. P. Sikora, S. De Santis, K. Hammond, “TE Wave measurements at CesrTA ,” in *Proceedings of ECLOUD 2010: 49th ICFA Advanced Beam Dynamics Workshop on Electron Cloud Physics, Ithaca, NY*, edited by K. Smolenski, in press, Paper PST04.

K. G. Sonnad, M. T. F. Pivi, J-L Vay, G. Rumolo, R. Tomas, F. Zimmermann, G. Franchetti, “An Update on Simulation of Beam Dynamics with Electron Cloud Effects,” in *Proceedings of ECLOUD 2010: 49th ICFA Advanced Beam Dynamics Workshop on Electron Cloud Physics, Ithaca, NY*, edited by K. Smolenski, in press, Paper PST05.

Kenneth Hammond, John Sikora, Kiran G Sonnad, Seth Veitzer, “Effects of Reflections on TE-Wave Measurements of Electron Cloud Density,” in *Proceedings of ECLOUD 2010: 49th ICFA Advanced Beam Dynamics Workshop on Electron Cloud Physics, Ithaca, NY*, edited by K. Smolenski, in press, Paper PST06.

M. G. Billing, G. Dugan, R. E. Meller, M. A. Palmer, G. A. Ramirez, J. P. Sikora, H. A. Williams, R. L. Holtzapple, “Techniques for Observing Beam Dynamical Effects Caused by the Presence of Electron Clouds,” in *Proceedings of ECLOUD 2010: 49th ICFA Advanced Beam Dynamics Workshop on Electron Cloud Physics, Ithaca, NY*, edited by K. Smolenski, in press, Paper PST07.

G. Dugan, D. Sagan, “Synrad3D Photon Propagation and Scattering Simulation,” in *Proceedings of ECLOUD 2010: 49th ICFA Advanced Beam Dynamics Workshop on Electron Cloud Physics, Ithaca, NY*, edited by K. Smolenski, in press, Paper PST08.

J. A. Crittenden, Y. Li, X, Liu, M. A. Palmer, J. P. Sikora, S. Calatroni, G. Rumolo, N. Omcikus, “Electron Cloud Modeling Results for Time-Resolved Shielded Pickup Measurements at CesrTA ,” in *Proceedings of ECLOUD 2010: 49th ICFA Advanced Beam Dynamics Workshop on Electron Cloud Physics, Ithaca, NY*, edited by K. Smolenski, in press, Paper PST09.
D. L. Kreinick, J. A. Crittenden, G. Dugan, Z. Leong, M. A. Palmer, R. L. Holtzapple, M. Randazzo, M. A. Furman, M. Venturini, “Using Coherent Tune Shifts to Evaluate Electron Cloud Effects on Beam Dynamics at CesrTA ,” in *Proceedings of ECLOUD 2010: 49th ICFA Advanced Beam Dynamics Workshop on Electron Cloud Physics, Ithaca, NY*, edited by K. Smolenski, in press, Paper PST10.
D. Rubin, D. Sagan, J. P. Shanks, Y. Yanay, “CesrTA Low Emittance Tuning,” in *Proceedings of ECLOUD 2010: 49th ICFA Advanced Beam Dynamics Workshop on Electron Cloud Physics, Ithaca, NY*, edited by K. Smolenski, in press, Paper PST11.
J. Kim, D. Asner, J. Conway, S. Greenwald, Y. Li, V. Medjidzade, T. Moore, M. Palmer, C. Strohman, “In Situ SEY Measurements at CesrTA ,” in *Proceedings of ECLOUD 2010: 49th ICFA Advanced Beam Dynamics Workshop on Electron Cloud Physics, Ithaca, NY*, edited by K. Smolenski, in press, Paper PST12.
L. Wang, M. Pivi, “Trapping of Electron Cloud in ILC/CesrTA Quadrupole and Sextupole Magnets,” in *Proceedings of ECLOUD 2010: 49th ICFA Advanced Beam Dynamics Workshop on Electron Cloud Physics, Ithaca, NY*, edited by K. Smolenski, in press, Paper MOD05.
D. L. Rubin, M. Billing, R. Meller, M. Palmer, M. Rendina, N. Rider, D. Sagan, J. Shanks, C. Strohman, “Beam Based Measurement of Beam Position Monitor Electrode Gains,” *Phys. Rev. ST Accel. Beams* **13**, September 2010, 092802.
S. De Santis, J. M. Byrd, M. Billing, M. Palmer, J. Sikora, B. Carlson, “Characterization of Electron Clouds in the Cornell Electron Storage Ring Test Accelerator using *TE*-Wave Transmission,” *Phys. Rev. ST Accel. Beams* **13**, July 2010, 071002.
J. W. Flanagan, H. Fukuma, H. Ikeda, T. Mitsuhashi, G. S. Varner, J. P. Alexander, N. Eggert, W. H. Hopkins, B. Kreis, M. A. Palmer, D. P. Peterson, “Measurement of Low-Emittance Beam with Coded Aperture X Ray Optics at CesrTA ,” in *Proceedings of the 2010 International Particle Accelerator Conference, Kyoto, Japan*, 2010, p. 966-968.

S. De Santis, J. Sikora, M. Billing, M. Palmer, B. Carlson, “TE Wave Measurements of the Electron Cloud in the Cesr-TA Ring,” in *Proceedings of the 2010 International Particle Accelerator Conference, Kyoto, Japan*, 2010, p. 1188-1190.
M. A. Palmer, M. G. Billing, R. E. Meller, M. C. Rendina, N. T. Rider, D. L. Rubin, J. Shanks, C. R. Strohman, R. L. Holtzapple, “CESR Beam Position Monitor System Upgrade for CesrTA and CHESS Operations,” in *Proceedings of the 2010 International Particle Accelerator Conference, Kyoto, Japan*, 2010, p. 1191-1193.
D. P. Peterson, J. P. Alexander, C. Conolly, N. Eggert, E. Fontes, W. Hopkins, B. Kries, A. Lyndaker, M. McDonald , M. Palmer, M. Rendina, P. Revesz, N. Rider, J. Savino, R. Seeley, J. W. Flanagan, “CesrTA x-Ray Beam Size Monitor Operation,” in *Proceedings of the 2010 International Particle Accelerator Conference, Kyoto, Japan*, 2010, p. 1194-1196.
M. G. Billing, G. Dugan, R. Meller, M. Palmer, M. Rendina, N. Rider, J. Sikora, C. Strohman, R. L. Holtzapple, “Techniques for Observation of Beam Dynamics in the Presence of an Electron Cloud,” in *Proceedings of the 2010 International Particle Accelerator Conference, Kyoto, Japan*, 2010, p. 1197-1199.

M. A. Palmer, J. P. Alexander, M. G. Billing, J. R. Calvey, C. Conolly, J. A. Crittenden, J. A. Dobbins, G. F. Dugan, N. Eggert, E. Fontes, M. J. Forster, R. E. Gallagher, S. W. Gray, S. Greenwald, D. L. Hartill, W. H. Hopkins, D. L. Kreinick, B. Kreis, Z. Leong, Y. Li, X. Liu, J. A. Livezey, A. Lyndaker, J. Makita, M. McDonald , V. Medjidzade, R. E. Meller, T. I. O'Connell, S. B. Peck, D. P. Peterson, G. Ramirez, M. C. Rendina, P. Revesz, D. H. Rice, N. T. Rider, D. L. Rubin, D. C. Sagan, J. Savino, R. M. Schwartz, R. Seeley, J. Sexton, J. Shanks, J. P. Sikora, C. R. Strohman, H. Williams, K. C. Harkay, R. Dowd, W. Guo, R. L. Holtzapple, L. Fabrizzo, M. Randazzo, D. Asner, E. Smith, F. Antoniou, S. Calatroni, M. Gasior, R. Jones, Y. Papaphilippou, J. Pfingstner, G. Rumolo, H. Schmickler, M. Taborelli, D. Gonnella, J. Jones, A. Wolski, M. C. Ross, C. Y. Tan, R. Zwaska, B. Carlson, T. Demma, J. Flanagan, P. Jain, K. Kanazawa, K. Kubo, K. Ohmi, H. Sakai, K. Shibata, Y. Suetsugu, M. Tobiyama, J. Byrd, C. M. Celata, J. Corlett, S. De Santis, M. Furman, A. Jackson, R. Kraft, D. Munson, G. Penn, D. Plate, M. Venturini, E. L. Wilkinson, L. Boon, A. F. Garfinkel, D. Kharakh, J. Ng, M. T. F. Pivi, L. Wang, L. Schächter, "Electron Cloud at Low Emittance in CesrTA ," in *Proceedings of the 2010 International Particle Accelerator Conference, Kyoto, Japan*, 2010, p. 1251-1255.

L. Wang, X. Huang, M. Pivi, "Electron Trapping in Wiggler and Quadrupole Magnets of CesrTA ," in *Proceedings of the 2010 International Particle Accelerator Conference, Kyoto, Japan*, 2010, p. 1892-1894.

J. R. Calvey, C. M. Celata, J. A. Crittenden, G. F. Dugan, S. Greenwald, Z. Leong, J. Livezey, M. A. Palmer, M. Furman, M. Venturini, K. Harkay, "CesrTA Retarding Field Analyzer Modeling Results," in *Proceedings of the 2010 International Particle Accelerator Conference, Kyoto, Japan*, 2010, p. 1970-1972.

J. R. Calvey, Y. Li, J. A. Livezey, J. Makita, R. E. Meller, M. A. Palmer, R. M. Schwartz, C. R. Strohman, K. Harkay, S. Calatroni, G. Rumolo, K. Kanazawa, Y. Suetsugu, M. Pivi, L. Wang, "CesrTA Retarding Field Analyzer Measurements in Drifts, Dipoles, Quadrupoles and Wigglers," in *Proceedings of the 2010 International Particle Accelerator Conference, Kyoto, Japan*, 2010, p. 1973-1975.

J. A. Crittenden, J. R. Calvey, G. F. Dugan, D. L. Kreinick, Z. Leong, J. A. Livezey, M. A. Palmer, D. L. Rubin, D. C. Sagan, K. Harkay, R. L. Holtzapple, M. A. Furman, G. Penn, M. Venturini, M. Pivi, L. Wang, "Progress in Studies of Electron-cloud-induced Optics Distortions at CesrTA ," in *Proceedings of the 2010 International Particle Accelerator Conference, Kyoto, Japan*, 2010, p. 1976-1978.

M. T. F. Pivi, L. Wang, T. Demma, S. Guiducci, Y. Suetsugu, K. Shibata, K. Ohmi, G. Dugan, M. Palmer, J. A. Crittenden, K. Harkay, L. Boon, M. A. Furman, M. Venturini, C. Celata, O. B. Malyshev, I. Papaphilippou, "Recommendation for the Feasibility of More Compact LC Damping Rings," in *Proceedings of the 2010 International Particle Accelerator Conference, Kyoto, Japan*, 2010, p. 3578-3580.

J. P. Shanks, D. Rubin, D. Sagan, "CesrTA Low Emittance Tuning," in *Proceedings of the 2010 International Particle Accelerator Conference, Kyoto, Japan*, 2010, p. 4620-4622.

J. Sikora, Y. Li, M. Palmer, S. De Santis, D. Munson, "A Shielded Pick-Up Detector for Electron Cloud Measurements in the Cesr-TA Ring," in *Proceedings of BIW 2010: Fourteenth Beam Instrumentation Workshop, Santa Fe, NM*, edited by Clay Dillingham, Joe Chew, 2010, p. 345-349.