

Brian Louis Beaudoin

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SUMMARY

Dr. Beaudoin has both led and participated in a wide range of beam physics experiments on UMER. He was responsible for designing, modeling and building the experimental hardware that was critical to the successful use of UMER for; including electromagnetic wide-band induction cavities, high voltage pulsed modulators, vacuum hardware and low-level electronics. He also led teams of students on numerous projects that couple electrical engineering, mechanical engineering, computer control system development and accelerator physics. Dr. Beaudoin has over 40 scientific publications and has given more than 10 scientific presentations at conferences worldwide.

EDUCATION

Ph.D. in Electrical Engineering, University of Maryland, 2011

Dissertation Title: Longitudinal Control of Intense Charged Particle Beams

Major/Minor Area: Electromagnetics/Microelectronics

GPA: 3.806

M.S. in Electrical Engineering, University of Maryland, 2008

Thesis Title: Longitudinal Space-Charge Waves Induced by Energy Modulations

Major/Minor Area: Electromagnetics/Microelectronics

GPA: 3.793

B.S. in Electrical Engineering, University of Maryland, 2002

GPA: 3.742

RESEARCH EXPERIENCE

Research Associate, University of Maryland, 2011-Current

University of Maryland Electron Ring (UMER) – An electron storage ring that uses scaled low-energy electron beams to cleverly access the intense, high-brightness, regime of beam operation in accelerators, at a much lower cost than larger more energetic machines.

- Performed Particle-In-Cell (PIC) simulations and experiments to explore novel nonlinear physics on coasting bunches including: plasma stream instabilities, solitary waves, space-charge waves and the interference of, and long space-charge dominated beams.
 - The first to develop a new diagnostic tool to measure the tune deviations induced at the edges of a coasting bunch from both longitudinal and transverse space-charge forces, inferring a longitudinal energy profile. The work was published in Physical Review Special Topics - Accelerators and Beams.
 - The first to observe a multi-stream instability in a long expanding electron beam, characterizing the instability as a function of injected bunch lengths and peak currents. Also performed simulations of the observed instability, obtaining excellent agreement with experimental measurements. This work will be submitted to Physics of Plasmas.

- The first to develop a method of suppressing space-charge waves that uses velocity modulations to flatten and suppress density modulations. This work was published in Nuclear Instrumentation and Methods A.
- Also collaborated on investigations of solitary waves induced through density perturbations. This work was published in Physical Review Letters.
- Was awarded a proposal entitled (Tunable Soliton Trains) – A proof-of-principle study that evaluates the use and tunability of soliton wave trains as a novel initial bunching mechanism.
- Has collaborated on multiple proposals both within the University of Maryland as well as with external laboratories (such as with LBNL, LLNL, FNAL).
- Has served as a lecturer and assistant for the United States Particle Accelerator School (USPAS) in 2008 and 2013, and is slated to assist in 2014 and in 2015 with a course in fundamentals of accelerators and one in cyclotrons.
- Has a collaborative patent pending with the university patent office, entitled: *Proton Therapy Range Modulation and Control*.
- Has mentored and guided TREND students and other high school, undergraduate and graduate students.
- Designed, modeled, etched and constructed pulsed modulators to drive wide-band electromagnetic cavities and loads. Has also developed low-level RF FPGA applications using Xilinx Design Suite, for use in feedback control of electron beams.
- Designing, in collaboration with Lawrence Berkeley National Laboratory, an experiment on the University of Maryland Electron Ring to model bunch compression in a Heavy Ion Fusion Driver for Inertial Fusion Energy.
- Designing in collaboration with Princeton Plasma Physics Laboratory, a component-based High Voltage Operational amplifier for use in a Paul Trap.

Radiation Facilities – The University of Maryland Radiation Facilities includes a 250 kW reactor, 100 kCi Co60 source and two 10 MeV electron accelerators, supporting a broad range of Maryland research and the education of graduate and undergraduate students in nuclear science.

- Constructing a new 10MeV electron accelerator for use as both an irradiator and research program in accelerator and beam physics.
- A NIST project that explores cable degradation when exposed to radiation in a nuclear power plant environment, and assesses the effectiveness of monitoring tests.

High Power Microwave (HPM) Group – Dedicated to designing, constructing and testing novel microwave structures including the rich history of gyrotrons, pasotrons and other high gradient accelerating microwave structures.

- Designing a high power (MW-Class) low frequency Inductive Output Tube (IOT) with a hybrid output cavity and a solid-state class-D grid driver for efficient ionospheric heating.

Graduate Research Assistant, University of Maryland, 2006-2011

- Performed PIC simulations and experiments to explore a novel method of longitudinally containing a long space-charge dominated beam using non-linear pulsed electric fields in a storage ring.
 - The first to transport a longitudinally space-charge dominated beam (with a tune-shift of 1) for over 12 km using an induction cavity on the University of Maryland Electron Ring. The work was published in Physics of Plasmas.

- Designed, modeled and constructed an electromagnetic cavity for the manipulation of high intensity electron beams to couple wide-band pulsed axial electric fields onto the beam.
- Designed, modeled, etched and constructed pulsed modulators to drive wide-band electromagnetic cavities.
- Designed, modeled and constructed an electromagnetic pickup cavity for use as a wideband GHz axial current profile diagnostic.
- Conducted multiple experiments using real-time data acquisition and processing schemes using MATLAB/LabVIEW/Python, to verify the standard physic models of the machine and how they are perturbed by the effects of intense space-charge.
- Supervised and mentored electrical engineering, mechanical engineering, computer engineering and physics undergraduate and graduate students.

Electrical Engineer, Naval Research Laboratory (Sachs Freeman Associates-Contractor), 2003-2006

- Conducted experiments using a number of IR lasers to create different calibrated and collimated sources for use in target and jammer scene generation.
- Designed and constructed circuits to initiate experimental runs and control/monitor the seeker.
- Extensive experience using data acquisition cards and LabVIEW to digitize data during experimental investigations.
- Extensive processing and data analysis experience using MATLAB, tracing real-time electronic responses from internal seeker electronics to various points within schematics to understand the requirements of a successful break-lock.

GRANTS

Collaborated on compilation of grant renewals and structuring of budgets as both a graduate student and Post-Doc:

1. **Awarded:** Physics of Space-Charge for Advanced Accelerator Applications – DESC0010301
2. **Awarded (PI):** Tunable Soliton Trains – UMD Seed Grant Phase I
3. Submitted (PI): Controlled Density Perturbations Studies on High-Brightness Longitudinally Uniform Beams in the Advanced Superconducting Test Accelerator (ASTA) – URA
4. Submitted (co PI): Enabling High Beam Intensity with Non-Linear Optics – DOE
5. Submitted (co PI): High-Intensity Beam Transport Using Nonlinear Optics – NSF

UNITED STATES PARTICLE ACCELERATOR COURSES

Fundamentals of Accelerators
 Accelerator Physics
 Microwave Measurements and Beam Instrumentation
 Beam Physics with Intense Space-Charge
 High Current Beam Physics in Induction Accelerators
 Laser-Plasma Accelerators

SERVICE

Refereed numerous papers for scientific journals including, Physical Review Letters, Nuclear Instruments and Methods and Physical Review Special Topics – Accelerators and Beams. Has also participated in, the organization and management of the University of Maryland Electron Ring laboratory. Served as the lab's safety officer, led lab tours for student groups, responsible for maintenance of the machine and its computer control system, as well as writing progress

reports, white papers, and proposals. Dr. Beaudoin has also assisted DOE with the review of SBIR proposals.

RESEARCH INTERESTS

Electromagnetics	RF Vacuum Tubes
Circular and Linear Particle Accelerators	Pulsed Cavities
Electron and Ion Beam Dynamics	Pulsed Power Electronics
RF Electronics	

TEACHING INTERESTS

Pulsed Power Physics	Charged Particle Dynamics
Electromagnetism and Waves	Mathematics
Analog and Digital Electronics	Physics
Basic Circuit Theory	Digital Logic Design

TEACHING EXPERIENCE

Future Assistant Lecturer, United States Particle Accelerator School (USPAS), 2015

- Cyclotrons

Future Assistant, USPAS, 2014

- Fundamentals of Accelerators

Guest Lecturer, University of Maryland, ENMA 422, 2013

- Introduction to Accelerators and Applications

Assistant, USPAS, 2013

- Fundamentals of Accelerators

Assistant Lecturer, USPAS, 2008

- Beam Dynamics Experiments on the University of Maryland Electron Ring

TEACHING ASSISTANT EXPERIENCE

Teaching Assistant, Electromagnetic Wave Propagation, University of Maryland, 2011

Teaching Assistant, Charged Particle Dynamics, University of Maryland, 2009

Teaching Assistant, Basic Circuit Theory, University of Maryland, 2006

Teaching Assistant, Basic Circuit Theory, University of Maryland, 2002

COMPUTER SKILLS

Operating Systems:	Windows, LINUX
Computer Languages:	Python, LabView, C/C++, BASIC
Scientific Applications:	MATLAB/Simulink, WARP (PIC Code), Xilinx Design Suite, Superfish, Poisson, Maxwell3D, HFSS, Trace
Technical Drawing:	Pro-E, SolidWorks
Office Applications:	PowerPoint, Excel, Word

AFFILIATIONS

- Member of the American Physical Society (APS).
- Member of the Directed Energy Professional Society (DEPS).

PRESENTATIONS

Invited

B.L. Beaudoin, "*Modeling HIF Relevant Longitudinal Dynamics in UMER*," 19th International Symposium on Heavy Ion Inertial Fusion, August 2012.

B.L. Beaudoin, "*Control of Longitudinal Perturbations*," Teleconference, Lawrence Berkeley National Laboratory, January 2012.

B.L. Beaudoin, "*Longitudinal Dynamics and Confinement on the University of Maryland Electron Ring*," Lawrence Berkeley National Laboratory, November 2011.

B.L. Beaudoin, "*Longitudinal Control of Intense Beams*," Princeton Plasma Physics Laboratory, October 2011.

B.L. Beaudoin, "*Longitudinal Confinement of an Intense Beam Using Induction Focusing*," 46th ICFA Advanced Beam Dynamics Workshop on High-Intensity, High-Brightness Hadron Beams, Morschach, Switzerland, September 2010.

Contributed

2013 International Particle Accelerator Conference, May 2013. "*Experimental Observations of a Multi-stream Instability in a Long Intense Beam*," Shanghai, China.

2011 Particle Accelerator Conference, March 2011. "*Space-Charge Effects in Bunched and Debunched Beams*", New York, NY.

2010 Advanced Accelerator Concepts Workshop, June 2010. "*Longitudinal Confinement of an Intense Beam Using Induction Focusing*", Annapolis, MD.

Joint ICFA Advanced Accelerator and Beam Dynamics Workshop (The Physics and Applications of High Brightness Electron Beams), November, 2009. "*Induction Focusing and Wave Generation on High-Brightness Electron Beams*", Maui, HI.

Sixth International Conference on Inertial Fusion Sciences and Applications, September, 2009. "*Longitudinal Focusing Studies for Heavy Ion Inertial Fusion*", San Francisco, CA.

MSS (Military Sensing Symposium) Conference, April, 2005. "*Jamming Requirements to Defeat an Infrared Shoulder-Fired SAM*", Classified Location.

JASPO (Joint Aircraft Survivability Program Office) Meeting, October, 2004. "*Classified Title and Location*"

PUBLICATIONS

Referred Journals

Authored:

B. Beaudoin and R.A. Kishek, "*Measurement of Tune in the Beam Ends as a Diagnostic Tool for Profiling the Momentum*," Physical Review Special Topics – Accelerators & Beams **16**, 114201 (2013).

B. Beaudoin, S. Bernal, C. Blanco, I. Haber, R.A. Kishek, T. Koeth, and Y. Mo, "*Modeling HIF Relevant Longitudinal Dynamics in UMER*," Nuclear Instruments and Methods A **733**, 178-181 (2014).

B. Beaudoin, I. Haber, R.A. Kishek, S. Bernal, T. Koeth, D. Sutter, P.G. O'Shea, and M. Reiser, "[*Longitudinal Confinement and Matching of an Intense Electron Beam*](#)," *Physics of Plasmas* **18**, 013104 (2011).

Coauthored:

Y.C. Mo, R.A. Kishek, D. Feldman, I. Haber, **B. Beaudoin**, P.G. O'Shea, and J.C.T. Thangaraj, "*Experimental Observations of Soliton Wave Trains in Electron Beams*," Physical Review Letters **110**, 084802 (2013).

K. Poorrezaei, R.B. Fiorito, R.A. Kishek, **B.L. Beaudoin**, "*New technique to measure emittance for beams with space charge*," Physical Review Special Topics – Accelerators & Beams **16**, 082801 (2013).

R.A. Kishek, **B. Beaudoin**, S. Bernal, M. Cornacchia, D. Feldman, R. Fiorito, I. Haber, T.W. Koeth, Y. Mo, P.G. O'Shea, K. Poor Rezaei, D. Sutter, and H. Zhang, "The University of Maryland Electron Ring Program," Nuclear Instruments and Methods A **733**, 233-237 (2014).

S. Bernal, **B.L. Beaudoin**, T. Koeth, and P.G. O'Shea, "*Smooth Approximation of Dispersion with Strong Space Charge*," Physical Review Special Topics - Accelerators & Beams **14**, 104202 (2011).

K. Fiuza, **B. Beaudoin**, S. Bernal, I. Haber, R.A. Kishek, P.G. O'Shea, C. Papadopoulos, D. Sutter, and C. Wu, "[*Design of a scaled recirculator for Heavy Ion Inertial Fusion*](#)," *Journal of Physics - Conference Series* **244**, 032029 (2010).

I. Haber, S. Bernal, **B. Beaudoin**, M. Cornacchia, D. Feldman, R.B. Feldman, R. Fiorito, K. Fiuza, T.F. Godlove, R.A. Kishek, P.G. O'Shea, B. Quinn, C. Papadopoulos, M. Reiser, D. Stratakis, D. Sutter, J.C.T. Thangaraj, K. Tian, M. Walter, and C. Wu, "[*Scaled electron studies at the University of Maryland*](#)," *Nuclear Instruments and Methods A* **606**, 64-68 (2009).

I. Haber, G. Bai, S. Bernal, **B. Beaudoin**, D. Feldman, R. Fiorito, T.F. Godlove, R. A. Kishek, P.G. O'Shea, B. Quinn, C. Papadopoulos, M. Reiser, J. Rodgers, D. Stratakis, D. Sutter, K. Tian, C.J. Tobin, M. Walter, and C. Wu, "[*Scaled electron experiments at the University of Maryland*](#)," *Nuclear Instruments and Methods A* **577**, 150-156 (2007).

Conference Proceedings

Authored:

B.L. Beaudoin, I. Haber, R.A. Kishek, and T. Koeth, "*Experimental Observations of a Multi-stream Instability in a Long Intense Beam*," Proceedings of the 2013 International Particle Accelerator Conference, Shanghai, China, May 2013, 2044 (2013).

B.L. Beaudoin, S. Bernal, K. Fiuza, I. Haber, R.A. Kishek, T. Koeth, M. Reiser, D. Sutter, and P.G. O'Shea, "*Space-Charge Effects in Bunched and Debunched Beams*," Proceedings of the 2011 IEEE Particle Accelerator Conference, New York, NY, Paper ID, MOOD51 (2011).

B.L. Beaudoin, S. Bernal, I. Haber, R.A. Kishek, T. Koeth, D. Sutter, and P.G. O'Shea, "[Longitudinal Confinement of an Intense Beam Using Induction Focusing](#)," Proceedings of 14th Workshop on Advanced Accelerator Concepts (AAC), Annapolis, MD, June 2010, (New York: AIP Press **1299**, 2010), p. 603.

B.L. Beaudoin, S. Bernal, M. Cornacchia, K. Fiuza, I. Haber, R.A. Kishek, T.W. Koeth, M. Reiser, D.F. Sutter, H. Zhang, and P.G. O'Shea, "[High Intensity Beam Physics at UMER](#)," Proceedings of the 46th ICFA Advanced Beam Dynamics Workshop on High-Intensity, High-Brightness Hadron Beams, Morschach, Switzerland, Sep 2010, 629 (2010).

B. Beaudoin, S. Bernal, K. Fiuza, I. Haber, R.A. Kishek, P.G. O'Shea, M. Reiser, D. Sutter, and J.C.T. Thangaraj, "[Longitudinal Beam Bucket Studies for a Space-Charge Dominated Beam](#)," Proceedings of the 2009 IEEE Particle Accelerator Conference, Vancouver, BC, Paper ID, FR5PFP058 (2009).

B.L. Beaudoin, S. Bernal, I. Haber, R.A. Kishek, P.G. O'Shea, M. Reiser, J.C.T. Thangaraj, K. Tian, M. Walter, and C. Wu, "[Application of Induction Module for Energy Perturbations in the University of Maryland Electron Ring](#)," Proceedings of the 2007 IEEE Particle Accelerator Conference, Albuquerque, NM, ed. C. Petit-Jean-Genaz, IEEE Cat. No. 07CH37866, 2322 (2007).

Coauthored:

J.L. Gonski, **B.L. Beaudoin**, S. Burcher, J.E. Krutzler, T.W. Koeth, "A Novel Optical Method for Measuring Beam Phase and Width in the Rutgers 12-Inch Cyclotron," Proc. 20th International Conference on Cyclotrons and their Applications, Vancouver, Canada, Paper ID WE1PB04, September 2013.

Y.C. Mo, **B.L. Beaudoin**, D. Feldman, I. Haber, R.A. Kishek, and P.G. O'Shea, "[Experimental Study of Soliton Wave Trains in Electron Beams](#)," Proceedings of the 2013 International Particle Accelerator Conference, Shanghai, China, May 2013, 1835 (2013).

S. Bernal, **B.L. Beaudoin**, M. Cornacchia, and D. Sutter, "[Stability of Emittance vs. Space-Charge Dominated Beams in an Electron Recirculator](#)," Proceedings of the 2013 North American Particle Accelerator Conference, Pasadena, CA, Sep/Oct 2013, TUPAC31 (2013).

R.A. Kishek, **B.L. Beaudoin**, S. Bernal, M. Cornacchia, D. Feldman, R. Fiorito, I. Haber, T. Koeth, Y.C. Mo, K. Poor Rezaei, K.J. Ruisard, W. Stem, D. Sutter, and H.D. Zhang, "[The University of Maryland Electron Ring \(UMER\) Program - Recent Developments](#)," Proceedings of the 2013 North American Particle Accelerator Conference, Pasadena, CA, Sep/Oct 2013, FROAA1 (2013).

W. Stem, **B.L. Beaudoin**, I. Haber, and T. Koeth, "[Experimental Detection of Envelope Resonance in a Space-Charge-Dominated Electron Ring](#)," Proceedings of the 2013 North American Particle Accelerator Conference, Pasadena, CA, Sep/Oct 2013, TUPAC32 (2013).

D.F. Sutter and **B.L. Beaudoin**, "[Measurement of Plasma Wave Speed from Electron Beam End Erosion](#)," Proceedings of the 2013 North American Particle Accelerator Conference, Pasadena, CA, Sep/Oct 2013, TUPAC33 (2013).

H.D. Zhang, **B.L. Beaudoin**, and R.A. Kishek, "*Experimental Study of Halo Formation in Space Charge Dominated Beam*," Proceedings of the 2013 North American Particle Accelerator Conference, Pasadena, CA, Sep/Oct 2013, FROAA6 (2013).

Invited: R.A. Kishek, **B. Beaudoin**, I. Haber, D. Feldman, T. Koeth, and Y. Mo, "*Longitudinal Space Charge Phenomena in an Intense Beam in a Ring*," Proceedings of the 52nd ICFA Advanced Beam Dynamics Workshop on High-Intensity and High-Brightness Hadron Beams, Beijing, China, Sep 2012, Paper ID, WEO1C05 (2012).

H. Zhang, **B. Beaudoin**, S. Bernal, R. Fiorito, R. Kishek, K. Poor Rezaei, and A. Shkvarunets, "*Beam Halo Measurements using Adaptive Masking Methods and Proposed Halo Experiment*," Proceedings of the 52nd ICFA Advanced Beam Dynamics Workshop on High-Intensity and High-Brightness Hadron Beams, Beijing, China, Sep 2012, Paper ID, MOP260 (2012).

S. Bernal, **B.L. Beaudoin**, M. Cornacchia, D. Sutter, and R.A. Kishek, "[Orbit Corrections for Alternative Lattices at the University of Maryland Electron Ring \(UMER\)](#)," [Proceedings of the 2012 International Particle Accelerator Conference, New Orleans, LA, USA, May 2012](#), 3993 (2012).

Yichao Mo, **B.L. Beaudoin**, D. Feldman, I. Haber, R.A. Kishek, P.G. O'Shea, and J.C.T. Thangaraj, "[Experimental Observations of Large-amplitude Solitary Waves in Electron Beams](#)," [Proceedings of the 2012 International Particle Accelerator Conference, New Orleans, LA, USA, May 2012](#), 1377 (2012).

K.J. Ruisard, **B.L. Beaudoin**, I. Haber, R.A. Kishek, and T. Koeth, "[Design of an Electrostatic Extraction Section for the University of Maryland Electron Ring](#)," [Proceedings of the 2012 International Particle Accelerator Conference, New Orleans, LA, USA, May 2012](#), 2964 (2012).

William Stem, **B.L. Beaudoin**, I. Haber, and T. Koeth, "[Recovering Measured Dynamics from a DC Circulating Space-charge-dominated Storage Ring](#)," [Proceedings of the 2012 International Particle Accelerator Conference, New Orleans, LA, USA, May 2012](#), 2967 (2012).

I. Haber, **B.L. Beaudoin**, S. Bernal, R.A. Kishek, T. Koeth, and Y.C. Mo, "*Experimental and Simulation Study of the Long-path-length Dynamics of a Space-charge-dominated Bunch*," Proceedings of the 2012 Linear Accelerator Conference, Tel Aviv, Israel, Sep 2012, Paper ID, THPB061 (2012).

T. Koeth, **B. Beaudoin**, S. Bernal, I. Haber, R.A. Kishek, and P.G. O'Shea, "*Longitudinal Relaxation of a Space-Charge Dominated Bunch*," Proceedings of the 2011 IEEE Particle Accelerator Conference, New York, NY, Paper ID, MOOB53 (2011).

S. Bernal, **B.L. Beaudoin**, T. Koeth, and P.G. O'Shea, "*Smooth Approximation of Dispersion with Strong Space Charge*," Proceedings of the 2011 IEEE Particle Accelerator Conference, New York, NY, Paper ID, WEP101 (2011).

R.A. Kishek, **B.L. Beaudoin**, S. Bernal, M. Cornacchia, K. Fiuza, I. Haber, T. Koeth, P.G. O'Shea, D.F. Sutter, and H. Zhang, "*Advances in Modeling the University of Maryland*

Electron Ring, "Proceedings of the 2011 IEEE Particle Accelerator Conference, New York, NY, Paper ID, WEP050 (2011).

D. Sutter, **B.L. Beaudoin**, S. Bernal, M. Cornacchia, R.A. Kishek, T. Koeth, P.G. O'Shea, and M. Reiser, "*Current Dependent Tune Shifts in the University of Maryland Electron Ring*," Proceedings of the 2011 IEEE Particle Accelerator Conference, New York, NY, Paper ID, WEP102 (2011).

S. Bernal, D. Sutter, **B. Beaudoin**, M. Cornacchia, K. Fiuza, I. Haber, R.A. Kishek, T. Koeth, M. Reiser, and P.G. O'Shea, "*Transverse Beam Physics in UMER - Update*," Proceedings of 14th Workshop on Advanced Accelerator Concepts (AAC), Annapolis, MD, June 2010, (New York: AIP Press **1299**, 2010), p. 580.

Timothy W. Koeth, **B. Beaudoin**, S. Bernal, I. Haber, R.A. Kishek, M. Reiser, and P.G. O'Shea, "*Measurement & Simulation of Interpenetration and DC Accumulation in the University of Maryland Electron Ring*," Proceedings of 14th Workshop on Advanced Accelerator Concepts (AAC), Annapolis, MD, June 2010, (New York: AIP Press **1299**, 2010), p. 608.

S. Bernal, D. Sutter, M. Cornacchia, **B. Beaudoin**, I. Haber, R.A. Kishek, M. Reiser, C. Wu, and P.G. O'Shea, "*Operational Studies of the 10 keV Electron Storage Ring UMER*," Proceedings of 13th Workshop on Advanced Accelerator Concepts (AAC), Santa Cruz, CA, July/Aug, 2008, (New York: AIP Press **1086**, 2009), p. 738.

Jayakar C.T. Thangaraj, **Brian Beaudoin**, Donald Feldman, Rami Kishek, Santiago Bernal, David Sutter, Martin Reiser, and Patrick O'Shea, "*Generation and transport of space charge waves in the University of Maryland Electron Ring (UMER)*," Proceedings of 13th Workshop on Advanced Accelerator Concepts (AAC), Santa Cruz, CA, July/Aug, 2008, (New York: AIP Press **1086**, 2009), p. 732.

S. Bernal, **B. Beaudoin**, T. Koeth, M. Cornacchia, D. Sutter, K. Fiuza, I. Haber, R.A. Kishek, C. Wu, C. Papadopoulos, M. Reiser, and P.G. O'Shea, "*Resonance Phenomena Over a Broad Range of Beam Intensities in an Electron Storage Ring*," Proceedings of the 2009 IEEE Particle Accelerator Conference, Vancouver, BC, Paper ID, FR5PFP059 (2009).

K. Fiuza, **B. Beaudoin**, S. Bernal, I. Haber, R.A. Kishek, M. Reiser, P.G. O'Shea, and D.F. Sutter, "*Modeling Acceleration of High-Intensity Space-Charge-Dominated Beams*," Proceedings of the 2009 IEEE Particle Accelerator Conference, Vancouver, BC, Paper ID, FR5PFP060 (2009).

R.A. Kishek, D. Stratakis, **B. Beaudoin**, S. Bernal, M. Cornacchia, I. Haber, P.G. O'Shea, M. Reiser, D. Sutter, J.C.T. Thangaraj, and C. Wu, "*Matching and Injection of Beams with Space Charge into the University of Maryland Electron Ring (UMER)*," Proceedings of the 2009 IEEE Particle Accelerator Conference, Vancouver, BC, Paper ID, FR5PFP061 (2009).

D. Sutter, S. Bernal, C. Wu, M. Cornacchia, **B. Beaudoin**, K. Fiuza, I. Haber, R.A. Kishek, M. Reiser, and P.G. O'Shea, "*Coherent Phenomenon Over a Range of Beam Intensities in the Storage Ring UMER*," Proceedings of the 2009 IEEE Particle Accelerator Conference, Vancouver, BC, Paper ID, FR5PFP063 (2009).

C. Wu, E.H. Abed, **B. Beaudoin**, S. Bernal, K. Fiuza, I. Haber, R.A. Kishek, P.G. O'Shea, M. Reiser, and D. Sutter, "[A Novel Beam Steering Algorithm Using Orbit Response Matrix](#)," Proceedings of the 2009 IEEE Particle Accelerator Conference, Vancouver, BC, Paper ID, FR5REP029 (2009).

J.C.T. Thangaraj, **B.L. Beaudoin**, S. Bernal, D. Feldman, R. Feldman, R.A. Kishek, P.G. O'Shea, C. Papadopoulos, M. Reiser, D. Stratakis, and D. Sutter, "[Space charge waves as a diagnostic to measure transverse beam size of space charge dominated beams](#)," Proceedings of the 2008 Beam Instrumentation Workshop, May 2008, Lake Tahoe, CA, (New York: AIP Press, 2008), p. 149.

C. Wu, E. Abed, **B.L. Beaudoin**, S. Bernal, R.A. Kishek, P.G. O'Shea, M. Reiser, and D.F. Sutter, "[Linear Resonance Analysis of Beams with Intense Space Charge in the University of Maryland Electron Ring \(UMER\)](#)," Proceedings of the 42nd ICFA Advanced Beam Dynamics Workshop on High-Intensity, High-Brightness Hadron Beams, Nashville, TN, Aug 2008, 165 (2008).

R.A. Kishek, G. Bai, **B. Beaudoin**, S. Bernal, D. Feldman, R. Feldman, R. Fiorito, T.F. Godlove, I. Haber, T. Langford, P.G. O'Shea, B. Quinn, C. Papadopoulos, M. Reiser, D. Stratakis, D. Sutter, K. Tian, J.C.T. Thangaraj, M. Walter, and C. Wu, "[The University of Maryland Electron ring \(UMER\) Enters a New Regime of High-Tune-Shift Rings](#)," Proceedings of the 2007 IEEE Particle Accelerator Conference, Albuquerque, NM, ed. C. Petit-Jean-Genaz, IEEE Cat. No. **07CH37866**,820(2007).

S. Bernal, **B. Beaudoin**, R.A. Kishek, M. Reiser, D. Sutter, and P.G. O'Shea, "[Low-current, Space-Charge Dominated Beam Transport at the University of Maryland Electron Ring \(UMER\)](#)," Proceedings of the 2007 IEEE Particle Accelerator Conference, Albuquerque, NM, ed. C. Petit-Jean-Genaz, IEEE Cat. No. **07CH37866**, 3561 (2007).

R.B. Fiorito, **B.L. Beaudoin**, S. Casey, D. Feldman, P.G. O'Shea, and B. Quinn, "[OTR Measurements of the 10 keV Electron Beam at the University of Maryland Electron Ring \(UMER\)](#)," Proceedings of the 2007 IEEE Particle Accelerator Conference, Albuquerque, NM, ed. C. Petit-Jean-Genaz, IEEE Cat. No. **07CH37866**, 4006 (2007).

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