

CAM 2011

Canadian-American-Mexican Graduate Student Physics Conference

September 29 – October 1, 2011

The Liaison Capitol Hill Hotel, Washington, DC

Condensed Matter Physics

Atomic Physics

Nuclear Physics and Astrophysics

Particle Physics

Biophysics

Nanoscience

Materials Physics

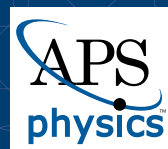
Optics

Computational Physics

Special Sessions on:

- Science for Diplomacy
- Science & Public Policy

Sponsored by:



The Canadian Association of Physicists, The American Physical Society and
The Sociedad Mexicana de Física

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México:

Sociedad Mexicana de Física
Red de Física de Altas Energías
(High-energy Physics Network)
CONACYT

Students/Post-docs:

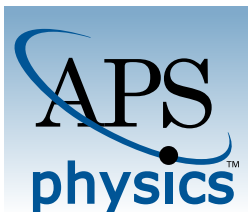
- Mr. Abhishek Kumar**, University of Massachusetts-Lowell, CAM2011 Chair, FGSA-International Affairs Officer
- Ms. Sarah Caudill**, Louisiana State University, FGSA Past-Chair
- Ms. Kimberly Boddy**, California Institute of Technology, FGSA
- Ms. Megan Comins**, Cornell University, FGSA Chair
- Dr. Kyler Kuehn**, Argonne National Lab, CAM2005 Chair, CAM2007 FGSA Representative
- Mr. Antonio A. Fernandez Marin**, Universidad Benemerita, SMF
- Mr. Ben Andrew Olsen**, Princeton University, FGSA
- Ms. Erin O'Sullivan**, Queens University, CAP
- Mr. Siddharth Shenoy**, Carnegie Mellon University, FGSA

Staff Advisors:

- Dr. Francine Ford**, Executive Director, CAP
- Dr. Henry van Driel**, President, CAP
- Dr. Romeo de Coss Gomez**, President, SMF
- Dr. Lilia Meza-Montes**, Secretary of Relations, SMF
- Dr. Amy K. Flatten**, Director of International Affairs, APS
- Ms. Michele Irwin**, International Programs Administrator, APS

Student Volunteers:

- Mr. Jerome T. Mlack**, Graduate Student, Johns Hopkins University
- Ms. Se Kwon Kim**, Graduate Student, Johns Hopkins University
- Ms. Wei Liu**, Graduate Student, Johns Hopkins University
- Ms. Danru Qu**, Graduate Student, Johns Hopkins University
- Ms. Yongjie Xin**, Graduate Student, Johns Hopkins University



*The Forum on Graduate Student Affairs
of the American Physical Society
One Physics Ellipse, College Park, Maryland 20740*

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Dear CAM 2011 Participants,

Welcome to Washington, D.C., and the CAM 2011 conference. The Organizing Committee—with the help of staff members from the three physics societies (APS, CAP and SMF) and numerous volunteers--have worked to put together another great CAM conference. Continuing the CAM tradition, this conference provides graduate students with a unique opportunity to educate, explore and enjoy physics across a variety of subfields and observe how physics is an integral part of our lives beyond the laboratory. This year, in addition to many student talks, invited talks and poster sessions there are two panel discussion sessions to highlight the role of scientists in national policy-making and diplomacy. As graduate students, we are the future of physics, and our collaborations and co-operation will hopefully promote scientific exchange and strengthen ties throughout North America.

I would like to congratulate and thank my fellow committee members, staff members of APS, SMF and CAP, members of the Local Organizing Committee and volunteers. I would also like to thank the American Physical Society's Forum on Graduate Student Affairs (FGSA) Executive Committee and CAM 2011 sponsors for their generous support and help organizing CAM 2011.

As you attend the sessions, use this unique opportunity to ask the invited speakers and students questions, provide your feedback and get to know your fellow participants. I hope you enjoy the many opportunities to converse, collaborate and cooperate with your colleagues and peers.

Thank you,

Abhishek Kumar
Chair, CAM 2011 Organizing Committee
APS Forum on Graduate Student Affairs
Center for Advanced Materials
University of Massachusetts Lowell
Lowell, MA 01854
Tel: 978-934-3718, Fax: 978-458-9571

2011 Canadian-American-Mexican Graduate Student Physics Conference

Liaison Capitol Hill • 415 New Jersey Avenue, NW • Washington, DC 20001

Thursday, 29 September:

- 8:00 – 9:00 Registration
- 9:00 – 9:30 **Welcoming Remarks** (Metropolitan Center)
 Dr. Kate Kirby, Executive Officer, American Physical Society (APS)
 Prof. Romeo De Coss Gómez, President, Sociedad Mexicana de Física (SMF)
 Dr. David J. Lockwood, Treasurer, Canadian Association of Physicists (CAP)
- 9:30 – 10:50 **Plenary Session 1**
E3: Earth, Energy and Environment (Metropolitan Center)
 Chair: Mr. Abhishek Kumar, Graduate Student, UMass Lowell, USA
- “Meeting the Energy Challenges: Why Physics is Not Enough”
 Dr. J. Patrick Looney, Brookhaven National Laboratory, USA
- “The World Energy Needs and Solar Energy”
 Prof. Claudio A. Estrada Gasca, Centro de Investigación en
 Energía UNAM, México
- 10:50 – 11:15 Coffee Break
- 11:15 – 12:30 **Parallel Sessions** (Student Speakers)
Materials Physics I (Metropolitan East)
Particle Physics I (Metropolitan West)
Computational Physics (Metropolitan Center)
- 12:30 – 13:30 Lunch Break (On Your Own)
- 13:30 – 14:50 **Plenary Session 2**
Particle Physics, Nuclear Physics & Astrophysics (Metropolitan Center)
 Chair: Ms. Erin O’Sullivan, Graduate Student, Queen’s University, Canada
- “A Holistic View of Cosmic Explosions”
 Prof. Alicia M. Soderberg, Harvard University, USA
- “Why we care about the Higgs Boson”
 Prof. Heather Logan, Carleton University, Canada
- 14:50 – 15:15 Coffee Break
- 15:15 – 16:30 **Parallel Sessions** (Student Speakers)
Nuclear Physics I (Metropolitan East)
Astrophysics (Metropolitan West)
Condensed Matter I (Metropolitan Center)

16:30 – 17:30 **Panel Discussion: “Careers in Science Policy: Challenges, Opportunities and Case Examples”** (Metropolitan Center)
Moderator: Dr. Amy K. Flatten, APS, USA

Speakers:

Dr. Laura Berzak, AAAS/APS Congressional Fellow, USA
Prof. Romeo De Coss Gómez, President, SMF, México
Dr. Michael Lubell, Director of Public Affairs, APS, USA
Dr. David J. Lockwood, National Research Council of Canada, Canada

18:00 – 20:00 **Welcome Reception**

Remarks:

Dr. Amy K. Flatten, Director of International Affairs, APS
Ms. Megan Comins, Chair, Forum on Graduate Student Affairs, APS

Friday, 30 September

09:00 – 10:20 **Plenary Session 3**
Biophysics & Nanoscience (Metropolitan Center)
Chair: Mr. Siddharth Shenoy, Graduate Student, Carnegie Mellon University, USA

“Visualizing Cells and Viruses at Molecular Resolution with 3D Electron Microscopy”

Dr. Sriram Subramaniam, National Institutes of Health, USA

“Graphene nanoflakes: energy gap engineering and vacancy-induced magnetism”

Prof. Romeo De Coss Gómez, CINVESTAV-IPN, Unidad Mérida, México

10:20 – 10:45 Coffee Break

10:45 – 12:00 **Parallel Sessions** (Student Speakers)
Particle Physics II (Metropolitan East)
Biophysics (Metropolitan West)
Condensed Matter II (Metropolitan Center)

12:00 – 13:00 Lunch Break (Box lunch will be provided)

13:00 – 14:20 **Panel Discussion: “Science, Foreign Policy and Diplomacy – Role of Scientific Societies and Other NGOs”** (Metropolitan Center)
Moderator: Ms. Kimberly Boddy, Graduate Student, Caltech, USA

Speakers:

Dr. Amy K. Flatten, Director of International Affairs, APS, USA
Dr. Dalal Najib, Program Officer, International Affairs, National Academy of Sciences, USA
Prof. Carmen Cisneros Gudiño, Instituto de Ciencias Físicas, Universidad Nacional Autónoma de México, México
Dr. Walter F. Davidson, National Research Council of Canada, Canada

- 14:20 – 14:40 Coffee Break
- 14:40 – 16:00 **Plenary Session 4**
Condensed Matter Physics & Material Physics (Metropolitan Center)
 Chair: Dr. Eric Sorte, University of Utah, USA
- “The social life of electrons”
 Prof. Nina Markovic, Johns Hopkins University, USA
- “Ancient Materials and Modern Analysis: Application of Condensed Matter
 and Nuclear Physics in Archeology”
 Prof. Kristin Poduska, Memorial University of Newfoundland, Canada
- 16:00 – 18:00 **Poster Session**
- 18:30 Meet in hotel lobby to walk to banquet venue as a group and pass
 through security. **Bring photo I.D.** *Photo identification is required
 to enter the Rayburn Building.*
- 19:00 **Banquet Dinner**
 Venue: Capitol Hill Rayburn House Office, Building Foyer

Saturday, 1 October

- 09:00 – 10:20 **Plenary Session 5**
Atomic & Optical Physics (Metropolitan Center)
 Chair: Mr. Antonio A. Fernandez Marin
- “Assembling and Disassembling light (synthesis, manipulation, measurement
 and storage of quantum information carried by light”
 Prof. Alexander Lvovsky, University of Calgary, Canada
- “Mechanical properties of propagation invariant beams and their effect
 in cold atoms”
 Prof. Rocio Jáuregui, Universidad Nacional Autónoma de México, México
- 10:20 – 10:40 Coffee Break
- 10:45 – 12:00 **Parallel Sessions** (Student Speakers)
Nuclear Physics II (Metropolitan East)
Optics and Atomic Physics (Metropolitan West)
Materials Physics II (Metropolitan Center)
- 12:00 – 12:30 **Closing Remarks** (Metropolitan Center)
 Dr. Amy K. Flatten, Director of International Affairs, APS
 Mr. Antonio A. Fernandez Marin, Student Representative, SMF
 Ms. Erin O’Sullivan, Student Representative, CAP
 Mr. Abhishek Kumar, Chair, CAM2011 Organizing Committee, Forum on
 Graduate Student Affairs, APS

Plenary Session 1: Earth, Energy and Environment

“Meeting the Energy Challenges: Why Physics is Not Enough”

Dr. J. Patrick Looney, Assistant Laboratory Director for Policy and Strategic Planning
Chairman, Sustainable Energy Technologies Department
Brookhaven National Laboratory
P.O. Box 5000, Upton, NY 11973-5000, USA
<http://www.bnl.gov/bnlweb/Admin/looney.asp>

Abstract: The US and the World face myriad of important challenges to meet the growing global energy demand while minimizing the ecological and environmental impacts of our energy use, notably—but not exclusively—climate change. Scientific contributions will be no doubt important to meeting the challenges for the future, not only for technological advances, but also to provide important inputs to policy and decision making processes and providing a basis for judging some the potential costs and benefits to society and the environment. In this talk I will outline the nature of the challenges we face and discuss why we all need to look beyond what physics has to offer for there to be a sustainable energy future.

“The World Energy Needs and Solar Energy”

Prof. Claudio A. Estrada Gasca, Director
Centro de Investigación en Energía UNAM
Privada Xochicalco S/N Col. Villa de las Flores,
AP 34, CP 62580 Temixco, Morelos, México
www.cie.unam.mx

Abstract: The current energy problem of the world and the energy problem in México are presented. The massive utilization of renewable energy sources as a solution for the sustainable and economical development of the countries is analyzed. The case of solar energy is discussed, as well as its photo-thermal and photo-photovoltaic technologies. The actual trend of the concentration solar technologies and the need for research and development in the area is also presented.

Plenary Session 2: Particle Physics, Nuclear Physics & Astrophysics

“Why We Care About the Higgs Boson”

Prof. Heather Logan, Department of Physics
Carleton University
1125 Colonel By Drive
Ottawa, ON K1S 5B6, Canada
<http://www.physics.carleton.ca/~logan/>

Abstract: Even after decades of glorious experiments in particle physics, we still don't know why particles have mass. Our best guess is the Higgs mechanism—the single part of the Standard Model yet to be experimentally tested. I'll explain the problem of mass and the Higgs solution, and describe how experiments currently underway at the Large Hadron Collider at CERN will help us answer one of the biggest questions in particle physics.

“A Holistic View of Cosmic Explosions”

Prof. Alicia M. Soderberg, Astronomy Department
Institute for Theory Computation
Harvard University
60 Garden St., MS-51
Cambridge, MA 0218, U.S.A
<https://www.cfa.harvard.edu/~asoderberg/Site/Home.html>

Abstract: For centuries, the study of catastrophic stellar explosions—supernovae—has focused almost exclusively on visual band observations. Yet many of the leading breakthroughs in our understanding of cosmic explosions have been led by observations outside of the traditional optical band. I will review new and future efforts to decipher the nature of these beasts using tools ranging from radio waves to gamma-rays.

Plenary Session 3: Biophysics & Nanoscience

“Visualizing Cells and Viruses at Molecular Resolution with 3D Electron Microscopy”

Dr. Sriram Subramaniam, Head, Biophysics Section; Senior Investigator, Laboratory of Cell Biology
National Cancer Institute
National Institutes of Health
50 South Drive, Room 4306
Bethesda, MD 20892-8008, U.S.A.
<http://ccr.cancer.gov/staff/staff.asp?profileid=5614>

Abstract: Emerging methods in 3D biological electron microscopy provide powerful tools and great promise to bridge a critical gap in imaging in the biomedical size spectrum. This comprises a size range of considerable interest that includes cellular protein machines, giant protein and nucleic acid assemblies, small subcellular organelles and bacteria. These objects are generally too large and/or too heterogeneous to be investigated by high resolution X-ray and NMR methods; yet the level of detail afforded by conventional light and electron microscopy is often not adequate to describe their structures at resolutions high enough to be useful in understanding the chemical basis of biological function. The long-term mission of our research program is to obtain an integrated molecular understanding of cellular architecture by combining novel technologies for 3D biological imaging with advanced methods for image segmentation and computational analysis. I will review our recent progress in imaging and modeling dynamic biological systems, with particular emphasis on applications to signal transduction, HIV/AIDS and cancer.

“Graphene nanoflakes: energy gap engineering and vacancy-induced magnetism”

Prof. Romeo De Coss Gómez, President, Sociedad Mexicana de Física
CINVESTAV-IPN, Unidad Merida
<http://www.mda.cinvestav.mx/personal/rcoss.htm>

Abstract: The electronic structure of graphene corresponds to a semi-metal with p-electrons at Fermi level, which are responsible of the unique electronic properties for this material. Graphene nanostructures show an energy gap resulting of the finite size, and are of current interest because of the potential applications in electronic devices. Thus, we discuss some recent progress in the synthesis of graphene nanoflakes obtained from the reaction of polyaromatic hydrocarbons. In this talk, we are presenting ab-initio results for the electronic properties of graphene nanoflakes of different effective radius (R) and different shapes. We find that the, Kohn-Sham gap decreases with size as R⁻¹, as predicted by the simple confinement model, while the quasi-particle energy gap follow the R^{-0.8} scaling rule. Secondly, the electronic structure of graphene nanoflakes with edge chemical

modifications using different atoms and functional groups is analyzed. The results suggest the feasibility of tailoring the electronic and optical properties of graphene nanostructures by edge doping. Finally, the problem of determining the magnetic moment of graphene nanoflakes with single-vacancy defects is addressed. Using the Fixed Spin Moment method, the ground state spin multiplicity and the spin magnetic distribution was obtained. We found that the ground state multiplicity is triplet, corresponding to a spin magnetic moment of $2 \mu_B$. From the analysis of the orbital spin distribution we found that the spin-polarized is equally distributed in the sp^2 and p_z orbitals. The nature of the sp -magnetism in this carbon nanostructures is discussed. Work supported by Conacyt-México under Grant No. 83604.

Plenary Session 4: Condensed Matter Physics & Materials Physics

“Ancient materials and modern analyses: applications of condensed matter and nuclear physics in archaeology”

Prof. Kristin Poduska, Department of Physics and Physical Oceanography
Memorial University of Newfoundland
St. John's, NL, A1B 3X7, Canada
<http://www.physics.mun.ca/~kris/contact.html>

Abstract: Archaeology makes extensive use of scientific analyses that are applied to materials collected from ancient sites. It's well known that radioactive isotopes of carbon can be used to determine the age of many materials, but isotopic analyses have much more to offer. When coupled with microscopic and nanoscopic-level structural investigations, isotope measurements provide clues about specimen formation and changes that may have occurred to it over time. As an example, I will show how these analyses reveal valuable insights on the technologies developed by Neolithic peoples in the Near East as they were on the brink of discovering pottery.

“The social life of electrons”

Prof. Nina Markovic, Department of Physics and Astronomy
Johns Hopkins University
Bloomberg 339
3400 N. Charles Street
Baltimore, MD 21218-2686
<http://physics-astronomy.jhu.edu/people/faculty/nina.html>

Abstract: Condensed matter physics investigates how fundamental rules of quantum mechanics and electromagnetism lead to a plethora of complex phenomena observed in nature. For example, when confined in a solid, electrons can interact with the solid and each other, forming collective states with entirely different properties than what might be expected from a collection of single electrons. I will discuss recent experimental results on electronic transport in low-dimensional systems that probe the limits of this collective behavior.

Plenary Session 5: Atomic & Optical Physics

“Light for quantum information science”

Prof. Alexander Lvovsky, Department of Physics and Astrophysics
University of Calgary
Calgary, Alberta T2N 1N4, Canada
<http://iqis.org/~lvov/>

Abstract: I will discuss recent advances and challenges associated with implementing light as the principal physical medium for quantum information processing. Light is an ideal quantum communication agent, but is difficult to handle in a controllable fashion. Quantum states of light are difficult to prepare, measure, store and bring into interaction with each other or with other quantum systems. Resolving these challenges is paramount for further development of quantum information science.

“Mechanical properties of propagation invariant beams and their effect in cold atoms”

Prof. Rocio Jáuregui, Departamento de Física

Profesor de Asignatura A

Instituto de Física

Investigador de Carrera Titular C.T.C.

Universidad Nacional Autónoma de México, México

http://www.fisica.unam.mx/ifunam_english/teorica/faculty.php

Abstract: The generation of optical fields that maintain their transverse structure over long distances has increased the interest in their theoretical and experimental study. Explicit expressions are known for four symmetries: rectangular (plane waves), circular (Bessel waves), elliptic (Mathieu waves) and parabolic (Weber waves). It is well known that the mechanical variable directly associated to plane waves is the linear momentum. The photons associated to Bessel waves carry a well defined orbital angular momentum. In this work, explicit expressions are given for the mechanical properties of Mathieu and Weber electromagnetic fields. The density of these mechanical variables are shown to be given by products involving derivatives of the electric and magnetic fields of the wave and can be interpreted as densities of products of linear and angular momenta.

The possibility that these mechanical properties can be transferred to cold atoms in optical lattices built from these structured beams is explored. We show that the atoms center of mass dynamics in this structured lattices is non trivial. The system exhibits quasi periodic and chaotic behaviors which can be controlled by varying the intensity of the beams. The presence of Levy-like flights on the transverse plane of the lattice, as well as the spectral density of the trajectories are used as chaos signatures. We also show that these light structures may be used to manipulate cold atoms. An scheme to split a cloud of thermal and ultracold atoms using a Weber beam is proposed. The possibility of enhancing quadrupole electric and dipole magnetic electronic transitions nearby the optical singularities of light beams is also explored.

Panel Discussions:

Careers in Science Policy: Challenges, Opportunities and Case Examples

Moderator: Dr. Amy K. Flatten, American Physical Society

Speakers:

Dr. Romeo De Coss Gómez

President, Sociedad Mexicana de Física

CINVESTAV-IPN, Unidad Merida

<http://www.mda.cinvestav.mx/personal/rcoss.htm>

Dr. Laura Berzak

American Association for the Advancement of Science (AAAS) and American Physical Society (APS)

Congressional Fellow

<http://www.krellinst.org/ssgf/community/alumni/profile?n=berzak2006>

Dr. Michael Lubell

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529 14th Street, NW Suite 1050
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Dr. David J. Lockwood

Treasurer, Canadian Association of Physicists
Institute of Microstructural Sciences
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Ottawa, ON, Canada
<http://www.nanoandgiga.com/~lockwood>

**Science, Foreign Policy and Diplomacy:
Role of Scientific Societies and Other NGOs**

Moderator: Ms. Kimberly Boddy, Graduate Student, Caltech

Speakers:

Dr. Amy K. Flatten

Director of International Affairs
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Dr. Dalal Najib

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Dr. Walter F. Davidson

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Prof. Carmen Cisneros Gudiño

Instituto de Ciencias Físicas, UNAM,
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<http://www.fis.unam.mx/index.php>

Thursday, 29 September

Session A: Materials Physics I (Metropolitan East)

Chair: Mr. Alexandre Yale

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|---------------|-----|---|
| 11:15 – 11:30 | A.1 | Michele Groce (USA)
<i>Temperature-dependent Capture-zone Scaling of C_{60} Nucleation on Silicon Oxide</i> |
| 11:30 – 11:45 | A.2 | Soumitra Satapathi (USA)
<i>Enhanced Efficiency in Dye Sensitized Solar Cells by Incorporation of Grapheme</i> |
| 11:45 – 12:00 | A.3 | Jerome T. Mlack (USA)
<i>Synthesis and Measurement of Topological Insulator Bi_2Se_3 Nanostructures</i> |
| 12:00 – 12:15 | A.4 | Gaurav Nanda (Canada)
<i>Organic Electrochemical Transistors for Sensor Applications</i> |
| 12:15 – 12:30 | A.5 | Renan Villarreal (Canada)
<i>New Phase in the Multiferroic Cupric Oxide (CuO)</i> |

Session B: Particle Physics I (Metropolitan West)

Chair: Ms. Razieh Pourhasan

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| 11:15 – 11:30 | B.1 | FNU Nuruzzaman (USA)
<i>Beam-line Optics Using Beam Modulation for the Q_{weak} Experiment at Jefferson lab</i> |
| 11:30 – 11:45 | B.2 | Buddhini P. Waidyawansa (USA)
<i>Transverse Asymmetry Results from the Q_{weak} Experiment</i> |
| 11:45 – 12:00 | B.3 | Satako Asahi (Canada)
<i>SNO+ Experiment</i> |
| 12:00 – 12:15 | B.4 | Scott MacEwan (Canada)
<i>The Weak Charge of the Proton – A Search for Physics Beyond the Standard Model</i> |
| 12:15 – 12:30 | B.5 | Valdemar Moratto (México)
<i>Relativistic Hydrodynamics</i> |

Session C: Computational Physics (Metropolitan Center)

Chair: Mr. Amando Alcázar-López

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|---------------|-----|--|
| 11:15 – 11:30 | C.1 | Craig Pelissier (USA)
<i>Lattice Quantum Chromodynamics</i> |
| 11:30 – 11:45 | C.2 | Michael Lujan (USA)
<i>Electric Polarizability in Lattice QCD</i> |
| 11:45 – 12:00 | C.3 | Vijay Kaul (USA)
<i>The effects of network structure on the spread of competing ideas</i> |

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| 12:00 – 12:15 | C.4 | Hassan Masoud (USA)
<i>Mesoscale Modeling of Transport Through Polymer Gels</i> |
| 12:15 – 12:30 | C.5 | Ricardo Mendez-Fragoso (México)
<i>Quantum Systems in a Semi-infinite Space Confined by Elliptical Cones</i> |

Session D: Nuclear Physics I (Metropolitan East)**Chair: Mr. Scott MacEwan**

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|---------------|-----|---|
| 15:15 – 15:30 | D.1 | Emily G. Jackson (USA)
<i>Gamma Ray Interaction in Planar Germanium Strop Detector</i> |
| 15:30 – 15:45 | D.2 | Vikram S. Prasher (USA)
<i>Revisiting k-isomers in ^{176}Hf via the $^{176}\text{Yb}(\gamma, n)$ Reactions</i> |
| 15:45 – 16:00 | D.3 | Laura Helena Gonzalez Trueba (México)
<i>Event Plane Determination with V0 Detector for ALICE experiment</i> |
| 16:00 – 16:15 | D.4 | Bassey E. Bassey (Canada)
<i>Effect of Buildup Region Electron Contamination Dose Modeling on Buildup Dose Calculation by a Commercial Treatment Planning System</i> |
| 16:15 – 16:30 | D.5 | Alex Laffoley (Canada)
<i>High-precision Half Life Measurement of ^{26}Na with a Fast Plastic Scintillator</i> |

Session E: Astrophysics (Metropolitan West)**Chair: Mr. Valdemar Moratto**

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|---------------|-----|---|
| 15:15 – 15:30 | E.1 | Jessie Otradovec (USA)
<i>Exploration of the Latest Numerical-relativity-inspired Waveforms from Compact Binary System Inspiral, Merger and Ringdown</i> |
| 15:30 – 15:45 | E.2 | Alejandro Avilés Cervantes (México)
<i>Parameterized Dark Degeneracy, the Dark Fluid and Multiple Interacting Cosmic Components</i> |
| 15:45 – 16:00 | E.3 | Razieh Pourhasan (Canada)
<i>Chameleon Gravity, Electrostatics and Kinematics in the Outer Galaxy</i> |
| 16:00 – 16:15 | E.4 | Miok Park (Canada)
<i>Deformations of Lifshitz Holography in Higher Dimensions</i> |
| 16:15 – 16:30 | E.5 | Alireza Hojjati (Canada)
<i>Application of the Principle Component Analysis to testing General relativity on Cosmological Scales</i> |

Session F: Condensed Matter Physics I (Metropolitan Center)**Chair: Ms. Laura Helena Gonzalez Trueba**

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|---------------|-----|--|
| 15:15 – 15:30 | F.1 | Jianwei Sun (USA)
<i>Thermopower Measurement of Gold Nanoparticle Wires</i> |
| 15:30 – 15:45 | F.2 | Wei Liu (USA)
<i>Dynamical Study of Phase Fluctuations and Their Critical Slowing Down in Amorphous Superconducting Films</i> |

15:45 – 16:00	F3	Hugo Marcelo Flores Ruiz (México) <i>The Role of the Boson Peak in the Glass Transition and its Possible Origin</i>
16:00 – 16:15	F4	Fabiola Azucena Gutiérrez (México) <i>Evidence of Paramagnetism in Water by AC Magnetic Susceptibility Measurements</i>
16:15 – 16:30	F5	Alexandre Yale (Canada) <i>Holographic Entanglement and Renyi Entropies</i>

Friday, 30 September

Session G: Particle Physics II (Metropolitan East)

Chair: Ms. Buddhini P. Waidyawansa

10:45 – 11:00	G.1	Erin O'Sullivan (Canada) <i>SNO+ and Solar Neutrinos: the Impact of the Pep Neutrino Measurement on Mixing Parameters, Sterile Neutrinos and Non-standard Interactions</i>
11:00 – 11:15	G.2	Michelle Boudreau (Canada) <i>Analytic Mass Reconstruction of $t\text{-}t$ Resonances in the Dilepton Channel</i>
11:15 – 11:30	G.3	Héctor Novales Sánchez (México) <i>Integration of Kaluza-Klein Modes in Yang-Mills Theories</i>
11:30 – 11:45	G.4	Adesh Subedi (USA) <i>The World's Highest Power Cryogenic Target for the Qweak Experiment</i>
11:45 – 12:00	G.5	Jose Manuel Torres Chavez (México) <i>Regularization of the generalized BSSN formulation for axisymmetric spacetimes</i>

Session H: Biophysics (Metropolitan West)

Chair: Mr. J. T. Mlack

10:45 – 11:00	H.1	Siddharth Shenoy (USA) <i>Binding Affinities of wt, H93R and a Truncated Mutant of PTEN to Lipid Membranes Containing PS and PI (4,5) P2</i>
11:00 – 11:15	H.2	Carl Pearson (USA) <i>TBA</i>
11:15 – 11:30	H.3	Francisco Javier Sierra Valdez (México) <i>A phenomenological study of sperm motility for searching the correct mechanism of anaesthesia</i>
11:30 – 11:45	H.4	Eno Hysi (Canada) <i>Detecting Red Blood Cell Aggregation with Photoacoustics: Theory and Experiment</i>
11:45 – 12:00	H.5	Deepa Raghu (USA) <i>Sub-cellular Tissue Sampling by Near-Field Laser Ablation: A "Protein Microscope" to Map Peptide Distributions in Cells</i>

Session I: Condensed Matter Physics II (Metropolitan Center)

Chair: Mr. Hassan Masoud

10:45 – 11:00	I.1	Anita Roychowdhury (USA) <i>A Dual Tip STM for Imaging the Superconducting Phase Difference</i>
11:00 – 11:15	I.2	Guillermo Cordourier-Maruri (México) <i>Entanglement between a Static and a Flying QUBIT in a Scattering Process: A relativistic Scenario</i>
11:15 – 11:30	I.3	Michel Savard (Canada) <i>Superfluid Flow and Critical Velocity of Liquid Helium in a Single Nanohole</i>
11:30 – 11:45	I.4	Francisco Gómez (México) <i>RLC Circuit of Fractional Order</i>
11:45 – 12:00	I.5	Shane Squires (USA) <i>Percolation and the Stability of Boolean Networks</i>

Saturday, 1 October

Session J: Nuclear Physics II (Metropolitan East)

Chair: Ms. Emily Jackson

10:45 – 11:00	J.1	Ryan Dunlop (Canada) <i>High-Precision Branching Ratio Measurement for the Superallowed β^+ Emitter ^{74}Rb</i>
11:00 – 11:15	J.2	Julian Michetti Wilson (Canada) <i>Characterization of LaBr_3 (Ce) Detectors for Picoseconds Lifetime Measurements</i>
11:15 – 11:30	J.3	Michael Busuttill (Canada) <i>High Precision Atomic Structure Calculations</i>
11:30 – 11:45	J.4	Eric Sorte (USA) <i>Evidence of Chaotic Behavior in Transverse Nuclear-Spin Decays</i>
11:45 – 12:00	J.5	Gareth W. Perry (Canada) <i>The Interconnection between Cross-polar Cap Convection and the Luminosity of Polar Cap Patches</i>

Session K: Atomic and Optical Physics (Metropolitan West)**Chair: Ms. Michelle Boudreau**

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|---------------|-----|--|
| 10:45 – 11:00 | K.1 | Abhishek Kumar (USA)
<i>One and Two-photon Fluorescence Spectroscopy of Curcumin</i> |
| 11:00 – 11:15 | K.2 | Jason Manson (Canada)
<i>Optical Properties of the Diluted Magnetic Semiconductors</i> |
| 11:15 – 11:30 | K.3 | Juan Nicolas Quesada (Canada)
<i>Strong Coupling in the Tavis-Cummings Model with 2 Emitters</i> |
| 11:30 – 11:45 | K.4 | Masood Samim (Canada)
<i>Nonlinear Optical Imaging of Heart Muscle Cells</i> |
| 11:45 – 12:00 | K.5 | Amando Alcázar-López (México)
<i>Spectral and Transport Properties of Unidirectional Chaotic Waveguides</i> |

Session L: Materials Physics II (Metropolitan Center)**Chair: Ms. Fabiola Azucena Gutierrez**

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|---------------|-----|---|
| 10:45 – 11:00 | L.1 | Zhigang Wu (Canada)
<i>Dissipative Dynamics of a Harmonically Confined Bose-Einstein Condensate</i> |
| 11:00 – 11:15 | L.2 | Parisa Pour Shahid Saeed Abadi (USA)
<i>Factors Affecting the Performance of Foil-supported Carbon Nanotube Forests as Thermal Interface Materials</i> |
| 11:15 – 11:30 | L.3 | John A. McLeod (Canada)
<i>Band gap Engineering in Ternary Oxides</i> |
| 11:30 – 11:45 | L.4 | Faranak Sharifi (Canada)
<i>Transport and Conducting RNA-Graphene-based Nanocomposites</i> |
| 11:45 – 12:00 | L.5 | Felipe Rivera (USA)
<i>TBA</i> |

16:00 – 18:00 Friday

- P.1:** Karol Baca (México)
Non-equilibrium Thermodynamic and Network Analysis of Transcription Factors in Breast Carcinomas
- P.2:** Dominique Brun-Battistini (México)
Stability Analysis of Three Constitutive Equations in Relativistic Heat Conduction: Eckart's, Relativistic Maxwell-Cattaneo's and Modified Exkert's
- P.3:** Ricardo Colin-Rodriguez (México)
Hydrogen Molecular ion and H₂ Molecules within Padded Spheroidal Cavities and Arbitrary Nuclear Positions
- P.4:** Raúl Cortés Maldonado (México)
Response of Irreversible and Semi-irreversible Type-II Superconductors Subjected to Rotating Magnetic Field
- P.5:** Antonio Alejandro Fernández-Marin (México)
Conductance Distribution for Photonic Crystals with Lavy-type Disorder
- P.6:** Julian Gonzalez-Ayala (México)
The Geometry of a Carnot Cycle and the Second Law of Thermodynamics for Physical and Non-physical Systems
- P.7:** Josafat Guerrero Jordan (México)
Structural and Electronic Properties of Cu-Pt Nanoparticles
- P.8:** Ana Hernandez (México)
Mass Variation in a Two Dimensional Regular Network
- P.9:** Margarita López (México)
Reproducibility of Fractional Anisotropy for Whole Brain, White Matter and Tracts of Interest Obtained with a 3T MR Scanner
- P.10:** José-Humberto Mondragón-Suárez (México)
Structure Formation in Dissipative Relativistic Systems
- P.11:** Areli Montes-Pérez (México)
Tomography Reconstruction of Objects with Edges Enhanced by Hilbert Transform
- P.12:** Gonzalo Moroyoqui Estrella (México)
Thermal Properties of High Order Crystalline Dielectric Mixtures
- P.13:** Didier Ojeda Guillén (México)
Harmonic Oscillator Realization from the Barut and Girardello Generalized Coherent States
- P.14:** Victor Ortiz (México)
Synthesis and Characterization of the System Fe_{1-x}Co_xSe_{0.92} (X = 0.00, 0.25, 0.50, 0.75, 1.00)

- P.15:** Juan Carlos Poveda (México)
Theoretical Analysis of Main Dissociative Channels of Non-conjugated Dienes TD-DFT
- P.16:** Uriel Rivera (México)
Beam Amplitude Modulation as a Phase Shifter for Phase-shifting Interferometry
- P.17:** Christian Sanabria (México)
Boltzmann-Gibbs and Pareto Wealth Distributions in a Network with an Arbitrary Degree
- P.18:** David Ignacio Serrano Garcia (México)
White Light Phase Shifting Cyclic Path Interferometry with Polarization Modulation
- P.19:** Caridad Vales-Pinzón (México)
Infrared Thermography Analysis of Thermal Diffusion in Magnetic Fluids Loaded With Carbon Nanotubes in the Presence of Uniform Magnetic Field
- P.20:** Sara Ejtemaee (Canada)
Towards Experiments in the Quantum Regime with Trapped ^{171}Yb Ions
- P.21:** Paul Bazylewski (Canada)
Stacking and Electronic Properties of High Mobility Anthracene-based Organic Semiconductors-Crystalline Structure without Annealing
- P.22:** Jay Forrest (Canada)
Metal-Graphene hybridization
- P.23:** Blessing Iserhienrhien (Canada)
A Statistical Study of Super Dual Auroral Radar Network Near Range Echoes
- P.24:** Badamsambuu Jigmeddorj (Canada)
The Conversion Electron Study for ^{110}Cd
- P.25:** Andrea Teigelhoefer (Canada)
Resonant laser Ionization Spectroscopy of Astatine
- P.26:** Ben Criger (Canada)
Proposal for Multiple Rounds of Errors Correction
- P.27:** Yoshihisa Ishizuka (USA)
Identification and Mapping of AKT Signaling pathways
- P.28:** Adam Hughes (USA)
Optical Sensors for Detection of Proteins

- P.29:** Jennifer Kuczynski (USA)
The π - Experiment at MAX-Lab
- P.30:** Berhan Demissie (USA)
Neutron Detection Efficiency of the Crystal Ball and TAPS
- P.31:** Micah Hawkins (USA)
The Relaxation of Vicinal (001) with ZigZag [110] Steps
- P.32:** Mark Herrera (USA)
The Path to Fracture in Granular Flows: Dynamics of Contact Networks
- P.33:** Louisa Riofrio (USA)
Lunar Orbit Anomaly
- P.34:** Ahmed Elhalawany (USA)
Decoherence-Assisted Single Electron Trapping at Room Temperature
- P.35:** Zachary Matheson (USA)
Effective Properties of Thin Films With Inclusions
- P.36:** Krista Freeman (USA)
Dynamics and Structure of Cellulose-Based Microgels under Varying Synthesis Conditions
- P.37:** Travis Harper (USA)
Photothermal Study of Concentrated Ficoll Solutions
- P.38:** Mahesh Narkhede (USA)
Polymer Nanofibers Based Sensors for Explosive Detection
- P.39:** Belter Ordaz Mendoza (USA)
Dynamical Casimir Effect: An Optomechanical Approach
- P.40:** Arun Nayak (USA)
Low Temperature Processable, Binderless Conductive Ink for Roll-to-roll Manufacturing of Flexible Electronics
- P.41:** Eloy Marquez (México)
Effect of Gust on Flow Pattern Around a Robotic Hummingbird Wing
- P.42:** Kyler Kuhen (USA)
TBA
- P.43:** Yongjie Xin (USA)
DiJet Bump Search with Substructure

