SFU DEPARTMENT OF PHYSICS

Newsletter 2008/2009

April 6, 2010

Chair's Message

Welcome to 2008/2009 version of the SFU Physics Newsletter. Yes, I know it is a little late but better late than never; we plan to assemble the 2009/2010 version in a more timely way. Please send comments and suggestions to me, Barbara Frisken, frisken@sfu.ca. Contributions for the 2009/2010 Newsletter are also welcome.

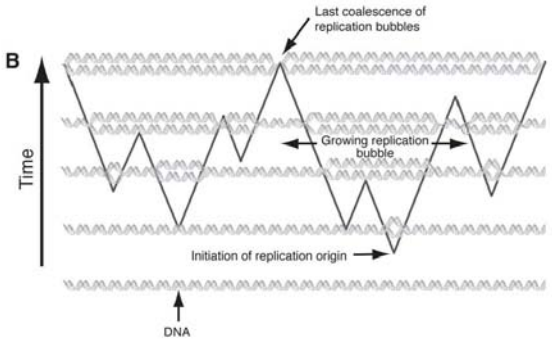
Comings and Goings

Bernd Stelzer joined the Department as a new Assistant Professor in September 2008. Dr. Stelzer completed his diplome in Physics in 2000 at the University of Heidelberg in Germany, followed by his doctorate in 2005 at the University of Toronto. His doctorate thesis focused on the search for single top quark production in the CDF experiment, one of the two large high energy particle collision experiments currently running at Fermi National Accelerator Laboratory. He is the recipient of the prestigious Alexander von Humboldt research stipend and comes to SFU from UCLA where he held the Feodor Lynen Postdoctoral Fellowship. During his studies, he acquired unique expertise in hadron collider physics, hardware and software development and data analysis methods. He has joined our experimental particle physics group and will work on the ATLAS experiment with them.

David Boal officially retired in December 2008. David first joined SFU in 1978 as a faculty member in Chemistry before settling in Physics several years later. Even for a theoretical physicist, David has tackled an impressive range of research topics: Raman spectroscopy of inorganic molecules, scattering cross-sections for quarks, fragmentation of large nucleons, and crumpling of biological membranes. An excellent teacher and mentor for both students and faculty, he was awarded the 1994 Faculty of Science Excellence in Teaching Award and has published material for a wide variety of courses by both traditional and on-line means. Dave has also assumed very important roles in department and university governance, serving as Chair of Physics and Coordinator of the Presidents' Committee on University Planning. Dave's retirement plans include completing his current research project "The Evolution of the cell's

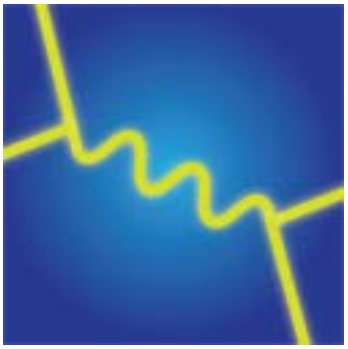
mechanical function and design", and spending more time on his numerous hobbies, which include singing in the Pacific Spirit Choir, painting, hiking and gardening.

Research Highlights



Scott Yang and John Bechhoefer's article "How Xenopus laevis embryos replicate reliably: Investigating the random-completion problem", published October 27, 2008 (*Phys. Rev. E* **78**, 041917 (2008)), was highlighted in *Physics*, a new journal published by the American Physical Society designed to spotlight exceptional research. *Physics* provides expert commentary articles that highlight select publications from *Physical Review* and *Physical Review Letters*. Suckjoon Jun and Nick Rhind wrote a *Viewpoint* article about this research (*Physics* **1**, 32 (2008)).

Graphene, a single layer of carbon atoms, continues to attract the attention of the world's condensed matter community. In a series of papers in Physical Review Letters and the Physical Review, Igor Herbut, with his Ph.D. student Bitan Roy and post-doctoral associate Vladimir Juricic (now a Vici fellow at Leiden University), has elucidated some of the possible effects of Coulomb interactions between electrons on the conductivity of graphene. In their 2008 Physical Review Letter (http://prl.aps.org/abstract/PRL/v100/i4/e046403), Herbut, Juricic, and collaborator Oskar Vafek (Florida State University) demonstrate that the combination of interactions and disorder due to wrinkles of graphene sheets may lead to a qualitatively new electronic phase with non-universal, but enhanced conductivity, as had been observed in recent experiments.

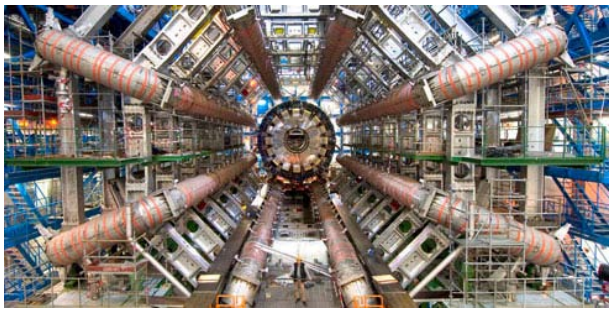


The journal *Physics* of the American Physical Society featured yet again new work from SFU physicists in the article "Producing Top Quarks One at a Time". This article highlights two Physical Review Letters (*Phys. Rev. Lett.* **103**, 092001, 092002 (2009)) submitted back-to-back in March, 2009 that proved definite observation of single top quark production at Fermilab's Tevatron collider. Bernd Stelzer was co-leader of the single top observation group at the CDF experiment while Dugan O'Neil and graduate student Dag Gillberg were lead authors on the D0 publication. SFU is the only institute to play a leading role in the single top quark observation in both Tevatron experiments.

Articles from SFU News

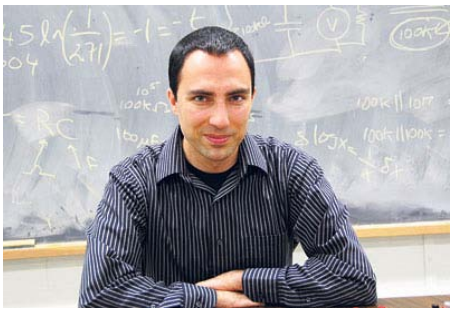
The following SFU News stories highlight some of the activities department members have been involved with:

- www.sfu.ca/sfunews/Stories/sfunews03200806.shtml - Preparations for first light at CERN's Linear Hadron Collider



- www.sfu.ca/sfunews/Stories/sfunews10300803.shtml - Halloween stargazing

- www.sfu.ca/sfunews/news/story_02050910.shtml - Staff Achievement Award won by Mehrdad Rastan



- www.sfu.ca/sfunews/news/story_03050905.shtml - Simon Watkins, APS Fellow and Outreach Coordinator

Events

SFU Openhouse 2008

We presented many exhibits including a very popular Physics for Kids section and a new exhibit created by Simon Watkins entitled "Pedal Power" that demonstrates the effort required to energize different lighting technologies (incandescent, fluorescent, and LED). Dugan O'Neil and Mike Vetterli presented a 3-D virtual tour of the ATLAS experiment in the IRMACS 3D theatre. There were also two performances of the Fearless Feats of Physics Show presented by Howard Trottier and Sarah Johnson with backstage help from Jeff Rudd and Michael Steger. Thanks to all for a great event!

Photos (from left to right): Travis Stewart, Greg Millar and Alireza Hojjati with Solar Telescope, Travis Stewart, Pat Nichols and David Lee making liquid nitrogen ice cream, David Lackner and Simin Bagheri demonstrating Pedal Power.

Poster Competition 2008

The 4th annual physics poster competition was held Friday, October 31, 2008. This informal event is an excellent opportunity for faculty, staff, students and visitors to meet others in the department, and to learn about some of the exciting research being done. SFU physics graduate students and postdoctoral fellows were invited to present posters describing their research projects to the department and a total of twenty five posters were presented. The posters were judged by a panel of experts and three prizes were awarded. The 2008 poster prize winners were Payam Mousavi ($1000 travel award), Benjamin Downing ($1000 travel award) and Michel Gauthier ($100 cash award).

International Year of Astronomy 2009 at SFU

SFU made plans to join the world to celebrate the 2009 International Year of Astronomy, marking the 400th anniversary of the year in which Galileo first turned a telescope on the cosmos, to reveal its textures lying beyond our unaided vision. SFU is an official host for the IYA, in conjunction with Canada's national organizing committee.

More details on the IYA @ SFU can be found at: http://www.sfu.ca/starrynights.

Ongoing

View the cosmos through a telescope!

The physics department hosts "Starry Nights @ SFU", free events that are open to the public. On these nights you can view a variety of celestial objects through our telescope, including planets, the Moon, star clusters, nebulae, and galaxies. We also take astronomical images with a CCD camera, which are then made publicly available for download. You are also welcome to bring your own binoculars or portable telescope: the more gear we have on hand, the merrier! For more information please visit our web site http://www.sfu.ca/starrynights. To receive up to date information on our public events please subscribe to the Starry Nights @ SFU mailing list by contacting Howard Trottier (Email: trottier@sfu.ca Phone: 778-782-4465).

Theses for 2008/2009

Undergraduate Honors Theses

Author	Semester	Title	Advisor
Mr. Braden Brinkman	1081	*Temperature Dependent Magnetoresistance in Layered Metals*	M. Kennett
Mr. Joel Zylberberg	1081	*Fisher Matrix and Principal Component Analysis of Constraints Imposed on Dark Energy and Modified Gravity by Future Cosmological Surveys*	L. Pogosian
Mr. Alex Loosley	1087	*Response characteristics of biological networks driven by oscillating sources*	E. Emberly
Mr. Patrick Belliveau	1091	*Dynamics and Hydrology of a Small Mountain Glacier*	G. Flowers
Mr. Paul Carriere	1091	*Implementation of High-Q Microwave Resonators for Spectroscopy of Unconventional Superconductors*	D. Broun
Ms. Savanna Shaw	1091	*Tau Identification at ATLAS Using Boosted Decision Trees*	D. O'Neil

Graduate Theses

Author	Degree	Title	Advisor
Ms. Jennifer Lynn Godfrey	MSc	*Using Boosted Decision Trees For Tau Identification in the ATLAS Experiment*	D. O'Neil
Mr. David Owen	MSc	*In-place Bonding of III-V Semiconductor Heterostructures*	P. Mooney
Mr. Jesse Petersen	MSc	*Nonlinear-Optical and Teraheretz Investigations of Complex Oxides*	J.S. Dodge
Mr. Erfan Rezaie	MSc	*Commissioning of the ALTAS Liquid Argon Calorimeters*	M. Vetterli
Mr. Bitan Roy	MSc	*Symmetries, Interactions and Phase Transitions on Graphene Honeycomb Lattice*	I. Herbut
Mr. John William Buker	PhD	*The Electroluminescence and Scanning Tunneling Microscopy of Single Molecules*	G. Kirczenow
Mr. Alexandre Gorelov	PhD	*Position-Neutrino Correlation Measurements in the Beta Decay of Magneto-Optically Trapped 38mK Atoms*	O. Hausser / H. Trottier
Ms. Maria Jaric	PhD	*Gaussian Fluctuations of Lipid Bilayer Vesicles: A Numerical Study*	M. Wortis
Mr. Weiyang Jiang	PhD	*Spontaneous Atomic Ordering in MOVPE Grown GaAsSb*	S. Watkins
Mr. Bartlomiej Kardasz	PhD	*Anisotropies and Spin Dynamics in Ultrathin Magnetic Multilayer Structures*	B. Heinrich
Mr. Oleksandr Mosendz	PhD	*Magnetization Dynamics in Ultrathin Magnetic Films*	B. Heinrich
Mrs. Simin Bagheri Najmi	PhD	*OMVPE Growth and Characterization of Carbon Doped inAs*	S. Watkins

Awards for 2008/2009

Undergraduate Awards for 2008/2009

Name	Title of Award
Carolyn Kierans	CUPC – Best Student Talk
Elena Barbir	NSERC USRA
Patrick Belliveau	NSERC USRA
Cisco Gooding	NSERC USRA
Jeffrey Ovens	NSERC USRA
Ryan Thomas	NSERC USRA
Eric Thewalt	NSERC USRA
Kevin Morse	John Pearson Prize - $250
Alex Loosley	Rudi Haering Award in Physics
Joel Zylberberg	Charter Physics Faculty Award
Braden Brinkman	NSERC PGS-M Postgraduate Fellowship
Cisco Gooding	NSERC PGS-M Postgraduate Fellowship
Mike McDermott	NSERC PGS-M Postgraduate Fellowship
Ray Ng	NSERC CGS Postgraduate Fellowship
Joel Zylberberg	NSERC PGS-M Postgraduate Fellowship
Joel Zylberberg	International Fulbright Science and Technology Award

Graduate Awards for 2008/2009

Name	Title of Award
Teresa Cheung	MSFHR Junior Graduate Fellowship
Noel Dawe	NSERC PGS-M Postgraduate Fellowship
Ben Downing	NSERC CGS Postgraduate Fellowship
Ben Downing	MSFHR Junior Graduate Fellowship
Jun-Qi Guo	BC Pacific Century Graduate Fellowship
Payam Mousavi	NSERC Industrial Postgraduate Fellowship
Albion Yang	Billy Jones Memorial Graduate Scholarship

Staff Awards and Recognition for 2008/2009

Name	Title of Award
Mehrdad Rastan	Simon Fraser University Staff Achievement Award: Work Performance

Faculty Awards and Recognition for 2008/2009

Name	Title of Award
David Broun	Faculty of Science Teaching Award
Eldon Emberly	CRC Tier 2 in Materials and Structural Biology (renewal)
Dugan O'Neil	Faculty of Science Teaching Award
Simon Watkins	Elected Fellow of the American Physical Society

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