BOSTON COLLEGE

GRADUATE SCHOOL OF ARTS AND SCIENCES

PHYSICS

DEGREE PROGRAMS

The Department of Physics at Boston College has a selective graduate program which offers a comprehensive course of study and research leading to the degree of Doctor of Philosophy (Ph.D.), as well as programs leading to a Master of Science (M.S.), and Master of Science in Teaching (M.S.T.) in conjunction with the Lynch Graduate School of Education. Courses emphasize a broadly-based foundation in the fundamental principles of physics, preparing the student to think independently and to undertake advanced research under the supervision of a faculty advisor. Our department is closely-knit, and graduate students are encouraged not only to collaborate closely with their research advisors, but also to draw upon the experience of the entire faculty and other graduate students. Our graduates go on to successful careers in many areas, including academic, industrial, and governmental positions.

Application Requirements

Applicants must submit the following: application forms, three letters of recommendation, official transcripts from all previously attended institutions, a statement of purpose, and official G.R.E. score reports. In addition, international applicants must submit official TOEFL score reports. Please visit the Graduate School of Arts and Sciences Admissions website for information on how to apply and links to the application form, www.bc.edu/gsas.

Doctoral Program

All students must pass the Comprehensive Examination to enter the doctoral program. Upon entering the doctoral program, each student shall select a field of specialization and establish a working relationship with a member of the faculty. With the approval of a faculty member, who normally shall be the principal advisor, the student shall inform the chairperson of his/her major field selection, and the chairperson shall appoint a faculty doctoral committee consisting of at least two full-time faculty members to advise and direct the student through the remainder of his/her graduate studies.

REQUIREMENTS

Required courses for the doctorate are the following: Statistical Physics II, Quantum Mechanics II, and Graduate Seminar I and II, plus four additional distributional courses in distinct areas outside the student's research specialty, chosen from the graduate electives of the department or from other graduate departments with the approval of the chairperson. Solid State Physics I is strongly recommended as one of these courses. Some teaching or equivalent educational experience is required. This requirement may be satisfied by at least one year of service as a teaching assistant, or by suitable teaching duties. Arrangements are made with each student for a teaching program best suited to his or her overall program of study.

COMPREHENSIVE EXAMINATION

Within one year of entering Boston College, each student must take the Comprehensive Examination, usually offered each September. Students with an advanced level of preparation (e.g., students with a master's degree in Physics) may choose to take this examination immediately upon entering Boston College. They should notify the department chair in writing of their intent to do so by mid July.

In principle, this examination covers all of physics that a student can be expected to know at the end of one year of formal course work in the doctoral curriculum; however, it will stress classical mechanics, electromagnetism, quantum mechanics, and statistical physics. The examination has both a written and an oral part. The examination is prepared and administered by a faculty committee, appointed by the chairperson, and the examination is evaluated by this committee with approval of the entire graduate faculty of the department.

RESEARCH AND THESIS

After passing the Comprehensive Examination, a student's principal activity is research. Normally, within a year after passing the Comprehensive Examination, the student shall take the Research Proposal Examination. The purpose of this examination is for the student to demonstrate knowledge of his area of research specialization and to expose the topic of his proposed thesis to scrutiny for its soundness and scientific merit. This will be done at a public meeting.

The examination will be evaluated by the student's doctoral committee, and the results reported to the chairperson and recorded in the student's file. Upon the student's satisfactory performance in this examination, the chairperson shall recommend to the dean the appointment of a doctoral thesis committee consisting of at least three department members (including the student's doctoral committee) and an external examiner, where feasible, to read and evaluate the completed thesis and to conduct an open meeting at which the thesis is defended in an oral examination. The thesis is accepted when endorsed on the official title page by the doctoral thesis committee after the oral examination.

GRADUATE CURRICULUM

A typical sequence of graduate courses during the first two years for a student interested in pursuing a Ph.D. is shown below.

Year I

Fall	Spring
Quantum I	Quantum II*
Math Physics	EM I
Mechanics	Statistical Physics I
(Grad. Sem. I*, if offered)	(Grad Sem. II*, if offered)

Year II

Fall	Spring
Statistical Physics II*	Distributional
Distributional	Distributional
(Grad. Sem. I*, if offered)	(Grad Sem. II*, if offered)

Notes:

(1) "Distributional" courses are basically electives, e.g., Solid State Physics I and II, Group Theory, Elementary Particle Physics, etc.; four distributional courses are required for the Ph.D.

(2) Courses required for the Ph.D. degree are marked by an asterisk.

Master's Program

Each candidate for a terminal master's degree must pass a Master's Comprehensive Examination administered by the department, and meet specified course and credit requirements. The examination shall be prepared by a committee of at least three faculty members appointed by the chairperson and usually shall be administered in September, upon student request. This committee shall evaluate the examinations in conjunction with the graduate faculty.

Generally no more than three credits of Readings and Research may be applied to any master's program. The M.S. degree is available with or without a thesis, and the M.S.T. requires a paper but no thesis.

M.S. WITH THESIS

This program requires 30 credits that normally consist of 27 credits of course work plus three thesis credits. Required courses include the following: Classical Mechanics, Statistical Physics I, Electromagnetic Theory I, Quantum Mechanics I, and the Physics Graduate Seminar I and II. The qualifying examination is essentially based on the contents of the first four required courses and is usually taken at the first opportunity following the completion of these courses. The M.S. thesis research is performed under the direction of a full-time member of the graduate faculty, professional, or research staff.

A submitted thesis shall have at least two faculty readers, including the director, assigned by the chairperson. The thesis is accepted after the successful completion of a public oral examination conducted by the readers.

M.S. WITHOUT THESIS

This program requires 32 credits of course work. The same courses and qualifying examination requirements for the M.S. with thesis apply here except that, in addition, Statistical Physics II and Quantum Mechanics II are required.

M.S.T.

The M.S.T. degree is offered in cooperation with the Lynch Graduate School of Education. This program requires at least 15 credits from graduate or upper divisional undergraduate courses in physics. These credits will most often include two of the following courses: Classical Mechanics, Statistical Physics, Electromagnetic Theory, Quantum Mechanics. The M.S.T. Qualifying Examination in physics will be based on the student's actual course program. A research paper supervised by a full-time member of the graduate faculty is required. The student must also satisfy the requirements of the Lynch Graduate School of Education, whose listings should be consulted for information.

INFORMATION

Admission and Financial Support

Students are strongly encouraged to have complete applications on file by January 2. General and subject GREs are required; students whose native language is not English must submit official TOEFL test results. Support for qualified students is available in the form of teaching assistantships. Research assistantships are also available during the summer and academic year, depending on research area and the extent of current funding. Typically, tuition is waived for qualified students. For information contact the department.

Waivers of departmental requirements, if not in violation of graduate school requirements, may be granted by recommendation of the graduate affairs committee with approval of the chairperson.

Boston College's participation in the Boston Area Graduate School Consortium enables students to cross-register for graduate courses at any of the member schools. Boston College is a member of the National Physical Science Consortium.

Department Overview

Over the past decade the Department of Physics at Boston College has undergone substantial growth, emphasizing collaborative experimental and theoretical research in novel electronic materials. During this period we have moved into a newly expanded and renovated building, significantly enhancing our research and educational infrastructure, and hired nine new faculty members, all leaders in their fields. Our program offers unique opportunities for graduate students to engage in cutting-edge research, and to participate in our continued growth.

Research Areas

We have groups conducting research in nanomaterials development and experimental and theoretical aspects of strongly correlated electron systems, utilizing state-of-the-art laboratory and computational facilities. Some specific areas of experimental interest include growth and characterization of carbon nanotubes and nanotube arrays, novel electronic materials in very strong magnetic fields, organic superconductors, angularly-resolved photoemission spectoscopy for studies of cuprate superconductors and other novel electronic materials, and the development of MEMS (micro-electromechanical systems) sensors. Some theoretical interests include quantum Monte Carlo simulations of models describing high-temperature superconductivity, simulations of thermoelectric transport in quantum well and quantum wire superlattices, design of quantum well devices for generating coherent terahertz radiation, the Quantum-Hall Effect in mesoscopic systems, the metal-insulator transition in high-temperature superconductors, and dense plasma phenomena.

Facilities

Departmental facilities include a transmission electron microscope and a scanning electron microscope, a wide array of materials preparation and fabrication equipment, extensive computational facilities, a high-resolution photoemission spectrometer, a low-temperature scanning tunneling spectroscopy microscope, several millikelvin refrigerators, and high field magnets, including a 46 tesla pulsed magnet. These facilities are housed in the recently expanded and renovated Higgins Hall. New to the University is a state-of-the-art nanofabrication clean room, with complete photolithographic and nanolithographic capabilities, including electron beam and focused ion beam instruments. The Department of Physics has strong collaborations with many outside facilities, including Los Alamos, Oak Ridge, and Brookhaven National Laboratories, as well as the Institute for Complex Adaptive Matter and the ISIS Rutherford-Appleton Laboratory.

FACULTY

PRADIP BAKSHI

Ph.D., Harvard University, 1962

Theoretical physics, including mathematical physics, quantum field theory, plasma physics and condensed matter physics. Current interests include: theory and applications of non-perturbative operator techniques and Lie algebraic methods; theory of plasma instabilities; current-driven plasma instabilities in lower dimensional solid-state systems; and theory of nanostructures, including quantum dot systems.

Some recent publications:

"Plasma Instabilities in Quantum Well Structures," *Condensed Matter Theories*, Vol. 20, Nova Science Publishers, **20**, 55-63, (2005).

"Einstein Frequency Distributions for Strongly Coupled Plasmas," *Contributions to Plasma Physics* **43**, 261 (2003).

"Intersubband Transport in Quantum Wells in Strong Magnetic Fields mediated by single- and two-electron processes," *Physical Review Letters* **88**, 226803 (2002).

KEVIN S. BEDELL, VICE PROVOST FOR RESEARCH AND JOHN H. ROURKE PROFESSOR OF PHYSICS

Ph.D., SUNY Stony Brook, 1979

Theoretical physics of condensed matter systems. Strongly correlated electron systems, including high Tc superconductors and heavy fermion materials; theory of local, marginal and other correlated Fermi liquids; properties of quantum fluids and solids.

Some recent publications:

"Acoustic attenuation probe for fermion superfluidity in ultracold-atom gases," *Physical Review Letters* **98**, 110407 (2007).

"Spin waves in quasi-equilibrium spin systems," *Physical Review Letters* **97**, 047204 (2006).

"Magnetization-dependent interaction parameters and prediction of a magnetic phase transition in a half metallic ferromagnet at T=0," *Physical Review B* **73**, 064412 (2006).

DAVID A. BROIDO

Ph.D., University of California, San Diego, 1985

Theoretical condensed matter physics. Theory of thermoelectric transport and phonon thermal conductivity in bulk and nanoscale semiconductor systems.

Some recent publications:

"Intrinsic lattice thermal conductivity of semiconductors from first principles," *Applied Physics Letters* **91**, 231922 (2007).

"Carbon nanotube ballistic thermal conductance and its limits," *Physical Review Letters* **95**, 096105 (2005).

"Length dependence of carbon nanotube thermal conductivity and the 'problem of long waves,'" *NanoLetters* **5**, 1221 (2005).

BALDASSARE DI BARTOLO

Ph.D., Massachusetts Institute of Technology, 1964

Luminescence spectroscopy of laser solids, molecular spectroscopy and flash photolysis, laser theory, theory of atomic and molecular spectra, photoacoustics, femtospectroscopy. Director of the International School of Atomic and Molecular Spectroscopy.

Some recent publications:

"Upconversion as a discriminating tool in the site-selective spectroscopy," *Journal of Applied Physics* **102**, 1 (2007).

"Dynamics of the excitation and upconversion processes in doped YA103:Pr single crystals," *Journal of Luminescence* (special issue dedicated to Prof. A.A. Kaplianski on the occasion of his retirement **125**, 223 (2007).

"Classical Theory of Electromagnetism," 2nd ed., *World Scientific*, New Jersey, London, Singapore, Hong Kong (2004).

JAN R. ENGLEBRECHT

Ph.D., University of Illinois, Urbana, 1993

Strongly correlated electron systems, including pairing correlations in high-temperature superconductors, Fermi Liquid vs. non-Fermi Liquid behavior in two-dimensional systems, and the theory of local Fermi liquids and the metal-insulator transition. Computational physics.

Some recent publications:

"S-wave Superconductivity in Weak Ferromagnetic Metals," *Philosophical Magazine Letters* **78**, 169 (1998).

"Pseudogap above T_c in a model with d_{x2-y2} pairing," *Physical Review B* **57**, 13406 (1998).

"BCS to Bose crossover: Broken-symmetry state," *Physical Review B* **55**, 15153 (1997).

GEORGE J. GOLDSMITH

Ph.D., Purdue University, 1955

Advanced undergraduate laboratory studies including nuclear magnet resonance (NMR) SQUID, ferroelectrics, photonics, solar cells, atomic force microscopy(AFM), modulation spectroscopy.

Some recent publications:

"Role of metal phthalocyanine in redox complex conductivity of polyaniline and aniline black," *Journal of Porphyrins and Phthalocyanines* **3**, 679 (1999).

"Copper phthalocyanine as an efficient dopant in development of solar cells," *Materials Research Bulletin* **12**, 539 (1997).

MICHAEL J. GRAF, ASSOCIATE CHAIRMAN

Ph.D., Brown University, 1987

Experimental condensed matter physics at low temperatures, including transport, thermodynamic properties, NMR, and muon spin spectroscopy of novel electronic materials, including quantum critical systems, molecular and single-ion magnets, and nanostructured thermoelectrics and superconductors.

Some recent publications:

"Quantum interference of surface states in bismuth nanowires probed by the Aharonov-Bohm oscillatory behavior of the magnetoresistance," *Physical Review* B **77**, 075332 (2008).

"Muon spin rotation studies of spin dynamics at avoided level crossings in $LiY_{0.998}H_{0.002}F_4$," *Physical Review Letters* **99**, 267203 (2007).

"Probing spin dynamics and quantum relaxation in $LiY_{0.998}H_{0.002}F_4$ via 19F NMR," *Physical Review B* **73**, 024403 (2006).

ANDRZEJ HERCZYNSKI

Ph.D., Lehigh University, 1987

Mathematical modeling in fluid dynamics and elasticity. Perturbation methods for thermal and mechanical processes in gases under reduced gravity and similarity solutions in hydrodynamics. Current projects include a collaboration with an art historian on fluid-dynamical aspects of Jackson Pollock's poured technique and fractal properties of his abstract patterns.

Some recent publications:

"Abstract expressionism and fractal geometry," in *Pollock Matters,* Ellen G. Landau and Claude Cernuschi, eds., McMullen Museum, August 2007.

"Subwavelength waveguide for visible light," *Applied Physics Letters* **90**, 021104 (2007).

"Two-fluid jets and wakes," *Physics of Fluids* **16**, 1037 (2004).

GABOR J. KALMAN

D.Sc., Israel Institute of Technology, 1961

Theoretical investigations of strongly correlated Coulomb systems (plasmas, electrons in solids). Systems include two-dimensional electron liquids, layered systems and superlattices, electron gases in strong magnetic fields, relativistic gases, dense compressed plasmas, dusty plasmas, plasma crystals, and charged particle bilayers. Properties studied include collective modes, response functions, nonlinear response, and plasma phase transitions.

Some recent publications:

"Equilibrium properties and phase diagram of two-dimensional Yukawa systems," *Physical Review E* **72**, 026409 (2005).

"Two dimensional Yukawa liquids: Correlations and dynamics," *Physical Review Letters* **92**, 465001 (2004).

"Dynamical structure functions, collective modes and energy gap in charged-particle bilayers," *Physical Review Letters* **90**, 226804 (2003).

KRZYSZTOF KEMPA

Ph.D., University of Wroclaw, 1980

Electronic, electromagnetic, and transport properties of lower-dimensional semiconductor systems. Strongly correlated electron systems in lower dimensions. Electromagnetics and Plasmonics of nanostructures. Discrete optics using radiotechnology analogues, e.g. nanoantenna, nanocoax, etc. Bioapplications of nanostructures. Photonic and plasmonic crystals.

Some recent publications:

"Superplastic carbon nanotubes," *Nature* **439**, 281 (2006).

"Electromagnetic response of a point-dipole crystal," *Physical Review B* **72**, 205103 (2005).

"Negative refraction and subwavelength lensing in a polaritonic crystal," *Physical Review B* **71**, 233101 (2005).

"Highly efficient molecular delivery into mammalian cells using carbon nanotube spearing," *Nature Methods* **2**, 449 (2005).

"Receiving and transmitting light-like radio waves: Antenna effect in arrays of aligned carbon nanotubes," *Applied Physics Letters* **85**, 2607 (2004).

VIDYA MADHAVAN

Ph.D., Boston University, 2000

Low-temperature scanning tunneling microscopy (STM, spectroscopy, and spin-polarized STM of novel electronic materials, including high-temperature superconductors and spintronic materials. STM of nanowires, nanomolecules, and biomolecules like doped silicon and DNA.

Some recent publications:

"A distinct bosonic mode in an electron-doped high-transition-temperature superconductor," *Nature* **450**, 1058 (2007).

"Imaging the granular structure of high-T-c superconductivity in underdoped $Bi_2Sr_2Ca_2O_{8+d}$," *Nature* **415**, 6870 (2002).

"Kondo response of a single antiferromagnetic chromium trimer," *Physical Review Letters* **87**, art. no. 256804 (2001).

"Observation of Spectral Evolution during the Formation of a Ni_2 Kondo Molecule," *Physical Review B* **66**, 212411 (2002).

MICHAEL J. NAUGHTON, CHAIRMAN

Ph.D., Boston University, 1986

Integrated science: experimental condensed matter and materials physics; electrical, magnetic studies of low dimensional and nanoscale matter; organic conductors; low temperature physics; pulsed magnetic field; nanoscale SPM development; biosensing, neural stimulation, solar energy conversion using nanocometal structures.

Some recent publications:

"La Tour des Sels de Bechgaard," in *The Physics of Organic Superconductors and Conductors Series: Springer Series in Materials Science,* Vol. 110, A.G. Lebed, Ed. (2008).

"Discretely guided electromagnetic effective medium," *Applied Physics Letters* **92**, 043114 (1-3) (2008).

"Subwavelenth transmission line for visible light," *Applied Physics Letters* **90**, 021104 (2007).

"Interference effects due to commensurate electron trajectories and topological crossovers in $(TMTSF)_2ClO_4$," *Physical Review B* **73**, 033016 (2006).

"Enhanced diamagnetism in the pseudogap state of the cuprate $Bi_2Sr_2CaCu_2O_{8+}$," *Physical Review Letters* **95**, 247002 (2005).

"Polymer microcantilevers fabricated via multiphoton absorption polymerization," *Applied Physics Letters* **86**, 064105/1-4 (2005).

"Magnetic determination of H_{c2} under accurate alignment in $(TMTSF)_2ClO_4$, *Physical Review Letters* **92**, 67001(1-4) (2004).

CYRIL P. OPEIL, S.J.

Ph.D., Boston College, 2004

Experimental condensed matter physics (2 < T < 300 K) including transport, dilatometry, magnetometry, resonant ultrasound, x-ray and UV photoemission on uranium single crystals and Martensite alloys. Ferroelectric material response under magnetic and electric fields. The physics of nano-composite (BixSb1-xTey) thermoelectric materials at low temperature.

Some recent publications:

"Combined experimental and theoretical investigation of the premartensitic transition in Ni2MnGa," *Physical Review Letters* in press.

"Heat capacity in magnetic and electric fields near the ferroelectric transition in triglycine sulfate," *Applied Physics Letters* **90**, 052910 (2007).

"Angle-resolved photoemission and first-principles electronic structure of α-U(001)," *Physical Review* B **75**, 045120 (2007).

"Electronic instabilities in shape-memory alloys: Thermodynamic and electronic structure studies of martensitic transition," *Physical Review* B **75**, 205119 (2007).

WILLIE J. PADILLA

Ph.D., University of California at San Diego, 2004

Terahertz, infrared, optical, and magneto-optical properties of novel materials utilizing various spectroscopic methods, including Fourier transform spectroscopy and ellipsometry. Current areas of interest include high temperature superconductors, pyrochlores, and artificial metamaterials (e.g. "left-handed" or negative index materials).

Some recent publications:

"A new class of metamaterials," *Nature Materials* **6**, 922 (2007).

"Properties of planar electric metamaterials for novel terahertz applications," *Journal of Nanoelectronics and Optoelectronics* **2**, 90 (2007).

"Ultrafast optical switching of terahertz metamaterials fabrication on ErAs/GaAs nanoisland superlattices," *Optics Letters* **32**, 1620 (2007).

"Group theoretical description of artificial electromagnetic metamaterials," *Optics Express* **15**, 1639 (2007).

ZHIFENG REN

Ph.D., Chinese Academy of Sciences, 1990

Carbon Nanotubes: synthesis, characterization, functionalization, properties, and applications. Nanowires and Nanoparticles: synthesis, characterization, and applications of semiconducting nanowires such as Si, Bi, ZnO, In_2O_3, TiO_2, etc., and nanoparticles such as Si, Ge, Bi, Bi_2Te_3, Sb_2Te_3, PbTe, PbSe, B_4C, SiC, etc. *Energy Conversion:* power generation and cooling using high ZT thermoelectrics, solar energy conversion by nanoantenna coax cable. *Field Emission:* studies on low voltage electron emissive materials. *Mechanical and Thermal Properties:* of nanowires, nanotubes, nanoparticles, and bulk. *Piezoelectric Properties:* of nanowires, nanotubes, and thin films. Piezoelectric Properties: Nanowires, nanotubes, and thin films. *Ceramics:* powder, thin and thick film processing and characterization of various ceramics including carbides, oxides, nitrides, borides, etc.

Some recent publications:

"High-thermoelectric performance of nanostructured bismuth antimony telluride bulk alloys," *Science* (2008) published online 20 March 200; 10.1126/science.1156446.

"Enhanced ductile behavior of tensile-elongated individual double-walled and triple-walled carbon nanotubes at high temperatures," *Physical Review Letters* **98**, 185501 (2007).

"New directions for low-dimensional thermoelectric materials," *Advanced Materials* **19**, 1 (2007).

"Superplastic carbon nanotubes," *Nature* **439**, 281 (2006).

REIN A. URITAM

Ph.D., Princeton University, 1968

Particle phenomenology, current algebra, broken symmetries; foundations of quantum mechanics; non-Western and Medieval scientific traditions; role of history and philosophy of science in physics education; role of science in liberal education; connection between science and religion.

Some recent publications:

"Review of What is Quantum Mechanics, A Physics Adventure," translated by John Nambu (Language Research Foundation, 1996), R.A. Uritam, *Journal of College Science Teaching* **27** (1997).

"Review of Early Physics and Astronomy; A Historical Introduction," Olaf Pederseon (Cambridge U.P., 1993). R.A. Uritam, *American Journal of Physics* **62**, 954, (1994).

"Review of Maxwell on Molecules and Gases," edited by Elizabeth Garber, Stephan Brush and C. Everitt (MIT Press, 1986), R.A. Uritam, *Journal of College Science Teaching* **18**, 57 (1988).

ZIQIANG WANG

Ph.D., Columbia Univeristy, 1989

Theory of novel electronic materials: localization, interaction and metal-insulator transitions; quantum H all effect; heavy fermion compounds; high temperature superconductors; quantum magnetism and electronim transport in high magnetic fields.

Some recent publications:

"Electron correlation and Fermi surface topology of Na_xCoO_2," *Physical Review Letters* **94**, 206401 (2005).

"Vortices, tunneling, and deconfinement in bilayer quantum hall excitonic superfluid," *Physical Review Letters* **94**, 176804 (2005).

"Tunneling, dissipation, and superfluid transition in quantum hall bilayers," *Physical Review Letters* **92**, 136803 (2004).

RECENT PH.D. THESES

2008-2009:

Joydeep Roy, "Magnetoresistance Oscillations and Dimensional Crossover in the Quasi 1D Compounds $(TMTSF)_2 ClO_4$ and $(DMET)_2I_3$" (Professor Naughton).

Zhihui Pan, "Angle-Resolved Photoemission Studies on High Temperature Superconductor $Bi_2Sr_2CuO_6$+8" (Professor Ding).

2007-2008:

Yong Sun, "Electrical and Mechanical Properties of Carbon Nanostructures" (Professor Naughton).

Chang-Jin Lee, "Nonlinear Effects in 2D and Layered Electronic Systems" (Professor Kalman).

Hari Dahal, "Correlation Effects in Dilute Fermi Liquids: Nonequilibrium Spin Systems and Graphene" (Professor Bedell).

2006-2007:

Milen Raytchev, "DNA on the Femtosecond, Picosecond and Nanosecond Time Scale – A Spectroscopic Study" (Professor Fiebig).

Raul Chura, "A Phenomenological Approach for the Half-Metallic Ferromagnets" (Professor Bedell).

Dezhi Wang, "Thermoelectric-Figure-of-Merit Enhancement of the Si-Ge through Nanocomposite Concept" (Professor Ren).

Bed Poudel, "A Study on Thermoelectric Properties of Nanostructured Bulk Materials" (Professor Ren).

Guangyong Xiong, "Synthesis, Characterization and Applications of Carbon Nanotubes and Silicon Nanowires" (Professor Ren).

Sen Zhou, "Electric Correlation and Geometric Frustration in NaxCo2" (Professor Wang).

2005-2006:

Debasish Banerjee, "ZnO Nanostructures and Nanoengineering" (Professor Ren).

Yang Wang, "Nanophotonics of Vertically Aligned Carbon Nanotubes: Two-Dimensional Photonic Crystals and Optical Dipole Antennas" (Professor Ren).

Shuo Chen, "Studies on Nanostructures Using Transmission Electron Microscopy" (Professor Ren).

Sergio Gaudio, "Consequence of Fermi Liquid Theory Close to a Diverging S-Wave Scattering Length" (Professor Bedell).

2004-2005:

Jason Jackiewicz, "Unconventional Ordering in Correlated Fermi Liquids and Gases" (Professor Bedell).

Xiwen Wang, "Optical Phenomena in Photonic and Polaritonic Crystals" (Professor Kempa).

Hongbo Yang, "Angle-Resolved Photoemission Spectroscopy Study on Nax-$CoCO_2$" (Professor Ding).

2003-2004:

Hongbo Zhao, "Attractive Hubbard and *t-j* Model Studies of High Temperature Superconductivity" (Professor Engelbrecht).

Stamatios Kyrkos, "Dielectric Properties, Screening and Compressibility for Bilayer Systems" (Professor Kalman).

Shancai Wang, "Evolution of electronic Structure in Ca_{s-x} Sr_xRuO_4 Studied by Angle-resolved Photoelectron Spectroscopy" (Professor Ding).

Heonick Ha, "Triplet Superconductivity and Interference Commensurate Oscillations in the Molecular Organic Superconductor $(TMTSF)_2 ClO_4$" (Professor Naughton).

Cyril P. Opeil, S.J., "Crossover from Anomalous to Conventional Antiferromagnetism and Probing for Quantum Critical Behavior in $U(Pt_{1-x}Pd_x)c$ with 0≤x≤0.020" (Professor Graf).

2002-2003:

Jeong II Oh, "Magnetic Studies in Organic Superconductors $(TMTSF)_2C10_4$: Upper Critical Fields and Vortex Matters" (Professor Naughton).

Giulio Gambarota, "Osmosis and Nuclear Magnetic Resonance Imaging of in Vitro Muscle" (Professor Graf).

2001-2002:

Guogang Feng, "Transportation and Response Properties of Non-Equilibrium Steady State Semiconductor Quartum Well Structures" (Professor Bakshi).

2000-2001:

Wenjin Mao, "Phase Competition in Strongly Correlated Systems" (Professor Bedell).

Vasiliki Plerou, "Quantifying Economic Fluctuations by Adapting Methods of Statistical Physics" (Professor Bedell).

BOSTON COLLEGE
Graduate School of Arts and Sciences
Department of Physics
Higgins Hall 335
140 Commonwealth Avenue
Chestnut Hill, MA 02467
617-552-3847
E-Mail: uritam@bc.edu
www.physics.bc.edu