GRADUATE SUPERVISORS

		ASTRONOMY, ASTROPHYSICS & RELATIVITY	CONDENSED MATTER PHYSICS & OPTICS	ENGINEERING & APPLIED PHYSICS	PARTICLE ASTROPHYSICS	THEORETICAL & COMPUTATIONAL PHYSICS	INSTRUMENTATION & DEVICE DEVELOPMENT
JOSEPH BRAMANTE joseph.bramante@queensu.ca	• Particle Theory, Dark Matter, and Cosmology	■			■	■	
ALEXANDER BRAUN braun@queensu.ca	• Physics of the Earth and Planets			■			
TUCKER CARRINGTON tucker.carrington@queensu.ca	• Molecular Quantum Physics		■			■	
MARK CHEN mchen@queensu.ca	• Neutrino Physics and Double Beta Decay				■		■
KEN CLARK kenneth.clark@queensu.ca	• Dark Matter Searches				■		■
JODI COOLEY jodi.cooley@snolab.ca	• Dark Matter Searches				■		■
MARC DIGNAM dignam@queensu.ca	• Nonlinear and Quantum Optics		■	■		■	
PHILIPPE DI STEFANO distefan@queensu.ca	• Particle Detectors and Rare-event Searches				■		■
LAURA FISSEL laura.fissel@queensu.ca	• Star and Planet Formation, Stratospheric Balloon Astronomy	■					■
JAMES FRASER james.fraser@queensu.ca	• Laser Applications and Ultrafast Nanostructure Dynamics		■	■			■
JUN GAO jungao@queensu.ca	• Organic Photonics and Iontronics		■	■			■
GUILLAUME GIROUX gg42@queensu.ca	• Dark Matter, Neutrinoless Double Beta Decay				■		■
ROBERT GOODING robert.gooding@queensu.ca	• Statistical Mechanics in Chromosome Biology		■			■	
STEPHEN HUGHES shughes@queensu.ca	• Theoretical Nanophotonics and Quantum Optics		■	■		■	
IVAN IORSH ivan.iorsh@queensu.ca	• Light-matter coupling at the nanoscale		■	■			■
JUDITH IRWIN irwinja@queensu.ca	• Interstellar Medium in Galaxies	■					
ROBERT KNOBEL knobel@queensu.ca	• Nanoscale Systems at Low Temperatures		■	■			■
THOMAS KRAUSE thomas.krause@queensu.ca	• Nondestructive Evaluation, Electormagnetic, Magnetic, Ultrasonic, Thermographic			■			■
KAYLL LAKE lakek@queensu.ca	• Black Holes and the Evolution of the Universe	■				■	
RYAN MARTIN ryan.martin@queensu.ca	• Neutrinos, Dark Matter, Machine Learning				■		■
JORDAN MORELLI morelli@queensu.ca	• Controlled Fusion, Plasma Physics, Renewable Energy			■			
TONY NOBLE potato@snolab.ca	• Dark Matter Searches				■		■
JEAN-MICHEL NUNZI nunzijm@queensu.ca	• Light-Matter Interactions, Photonics Devices		■	■			■
NAHEE PARK nahee.park@queensu.ca	• High-energy Neutrino, Gamma-Ray, and Cosmic-Ray Astrophysics	■			■		■
NIR ROTENBERG nir.rotenberg@queensu.ca	• Quantum Nanophotonics, Quantum Devices, Quantum Information Processing		■	■			■
SARAH SADAVOY sarah.sadavoy@queensu.ca	• Molecular Clouds, Star and Planet Formation	■					
STEPHEN SEKULA stephen.sekula@queensu.ca	• Astrophysics, Dark Matter, Supernovas				■		■
BHAVIN SHASTRI bhavin.shastri@queensu.ca	• Nanophotonics, Neuromorphic Computing, Quantum Machine Learning		■	■			■
KRISTINE SPEKKENS kristine.spekkens@queensu.ca	• Extragalactic Astrophysics	■					
JAMES STOTZ jstotz@queensu.ca	• Semiconductor Spintronics and Quantum Dots		■	■			■
GREG VAN ANDERS gva@queensu.ca	• Soft Matter, Materials, Networks, Complex Systems		■	■		■	
AARON VINCENT aaron.vincent@queensu.ca	• Astroparticle Theory, Dark Matter, Neutrinos, Cosmology	■			■	■	
GREGG WADE wade.gregg@queensu.ca	• Structure and Impact of Magnetic Fields in Stars	■					
LARRY WIDROW widrow@queensu.ca	• Galactic Dynamics, Dark Matter, and Cosmology	■				■	
ALEX WRIGHT awright@queensu.ca	• Neutrino Physics, Dark Matter				■		■

RESEARCH AREAS

The Department of Physics, Engineering Physics & Astronomy at Queen's University is one of the leading Canadian research institutes in Physics, Engineering Physics and Astronomy. Our faculty includes high-profile, world-class physicists who work on cutting edge areas of theoretical, computational, applied and experimental physics. Our students have the opportunity to engage in international collaborations as well as interdisciplinary research with other departments at Queen's, and work in state-of-the-art laboratories. If you have questions about joining our graduate programs, please email us at physgrad@queensu.ca.

ASTRONOMY, ASTROPHYSICS & RELATIVITY

Research topics include cosmology, dark matter, relativity, early Universe cosmology, galaxy structure and formation, the interstellar medium, stellar populations, stellar atmospheres, and the formation of stars and planetary systems. Research activities involve theory, numerical analysis, simulations, and observations at leading astronomical facilities around the world and across the electromagnetic spectrum.

CONDENSED MATTER PHYSICS & OPTICS

The objectives of condensed matter physics are to provide an understanding of the enormously rich behaviour of condensed matter systems under a wide variety of conditions. Systems consist of combinations of the hundred or so elements in the form of solids (semiconductor quantum dots, atomic-thick sheets, etc.), liquids, and dense gases, in which the multitude of constituent parts are all interacting with one another. These interactions lead to novel characteristics that are both fascinating and practical in that they might be exploited as the foundation for the next technological revolution. Interaction with light, whether to probe the mysteries of the system, or to generate new forms of light-matter interactions and quantum states of light, is a particular area of focus within the new Nanophotonics Research Centre.

ENGINEERING & APPLIED PHYSICS

Research in the group covers a wide range of topics, with the common theme of applying basic science and physics principles to improve the quality of life and to solve current or future problems facing people both in Canada and worldwide. This research spans areas of photonics, neuromorphic photonics, quantum networks, quantum information technology, medical physics, non-destructive evaluation, materials physics, electronic device physics, and plasma physics.

PARTICLE ASTROPHYSICS

Members of the particle astrophysics group are involved in a variety of projects to search for dark matter, better understand neutrinos, and develop new particle detector technologies. Historically, the group has played a leadership role in the SNO experiment, culminating in one member of the group, Prof. McDonald, sharing the 2015 Nobel Prize in Physics. The group has since played an important role in establishing SNOLAB as well as the McDonald Canadian Asroparticle Physics Research Institute.

THEORETICAL & COMPUTATIONAL PHYSICS

Research in theoretical physics covers quantum optics, particle physics, astrophysics, condensed matter, chemical and mathematical physics. Theorists at Queen's use mathematical and physical techniques, as well as statistical modeling and computational physics, to tackle a variety of research questions. Students acquire skills in analytical methods and advanced research computing to better understand various research themes in the department, including quantum and nonlinear optics, nanophotonics, advanced electromagnetism, quantum computing, as well as the Universe and the laws that govern it.

INSTRUMENTATION & DEVICE DEVELOPMENT

We develop new experimental tools so we can explore the world and universe around us with unprecedented clarity. Students learn to design and build instruments that can work down to atomic spatial resolution and femtosecond temporal resolution, and with sensitivities to see single photons or never-before observed sub-atomic particles. They invent new devices to solve pressing technical challenges, and benefit from mentorship from staff instrument makers in a well-equipped machine shop and NanoFabrication Kingston.