

Graduate studies in Physics and Astronomy

The Physics and Astronomy department has nationally and internationally prominent programs in several areas of research and study. The department benefits greatly from its proximity to a number of outstanding government laboratories where many adjunct faculty are involved in our graduate programs.

The graduate program in Physics and Astronomy is structured so that students are fully engaged in research by the end of their first year of courses. Financial aid is available in the form of scholarships, teaching assistantships, and grant-funded research assistantships. Our former graduate students are well represented in faculty positions in Canada and across the world; three are Canada Research Chairs.

Programs and degrees

The Department of Physics and Astronomy offers programs of study and research leading to degrees of Master of Science and PhD. Entry into the MSc and PhD degree programs require a basic knowledge of physics which is supplemented with knowledge in the field of specialization.

Astronomy and Astrophysics:

Faculty research interests include observational and theoretical cosmology, galaxy formation and evolution, clusters of galaxies, large-scale structure, computational astrophysics, galactic structure, stellar structure and evolution, supernovae and supernova cosmology, globular clusters, stellar atmospheres, and gravitational lensing. Instrumentation development is underway to deploy balloon or satellite-based stable calibration sources. The Astronomy Group benefits from close relations with the nearby Herzberg Institute of Astrophysics, its staff, telescopes, and instrumentation.

Condensed Matter Physics:

Research in condensed matter physics encompasses both fundamental studies and applications in magnetism, quantum devices, semiconductor physics, and nanoscale physics in general. Current research in magnetism includes ultrafast magnetic imaging using modern femtosecond laser techniques, in-situ studies of magnetic properties of thin films and nanostructured magnetic materials, computational magnetic microscopy, and the physics of multiferroic materials. Research in quantum devices is focused on charge and spin based quantum computation with semiconductors and superconductors. Research in semiconductor physics includes spintronics and nanoscale dynamics.

Experimental Particle Physics:

The particle physics group is engaged in the high energy frontier, flavour and neutrino physics research at facilities around the world, and benefits from interactions with TRIUMF physicists and access to TRIUMF facilities. Current activities of the group include detector operation and physics studies on the ATLAS experiment at CERN; analysis of the data collected by the BABAR detector at SLAC and development of a Super-B factory in Italy; detector operation and data analysis on the T2K long-baseline neutrino experiment in Japan; research and development on e+e linear colliders; and development and deployment of grid and cloud computing.

Medical Physics:

Research in Medical Physics is conducted at UVic, the BC Cancer Agency – Vancouver Island Centre (VIC) and the life science program at TRIUMF in Vancouver. Research is focused on the application of radiation (photons and electrons) to treatment and diagnosis of disease. Efforts are centred on: radiation transport modeling (Monte Carlo techniques); intensity modulated radiation therapy; 3D dosimetry techniques; clinical applications; vibrational spectroscopic techniques for applications in radiobiology; and uses of radioisotopes in diagnosis and PET studies. Additionally, the Medical Physics group has collaborations with Chemistry and the Deeley Research Centre at VIC (molecular biology).

Physics and Astronomy

www.phys.uvic.ca/grad/grad.html

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Ocean Physics and Geophysics:

Research is conducted in the department and also in association with the School of Earth and Ocean Sciences at UVic and at the nearby Institute of Ocean Sciences, the Pacific Geoscience Centre, and the Canadian Centre for Climate Modelling and Analysis. Current activities include observational and theoretical studies of ocean mixing, air-sea interaction, estuarine circulation, breaking waves and bubble clouds, and the investigation of many topics related to the analysis and modelling of interannual variability of the earth's climate.

Theoretical Physics:

Current areas of research focus on questions in particle and astroparticle physics: the physics of the electroweak scale, the nature of dark matter, and the role of particle physics in the early universe. Further research areas include more formal study of strongly interacting regimes of quantum field theory, using various techniques e.g. from string theory. The group has strong links with the Perimeter Institute and with TRIUMF.

Funding opportunities and deadlines

Major sources of funding, other than external awards, include University of Victoria Fellowships and Research Assistantships. Applicants are automatically considered for such awards when their application to enter a graduate program is evaluated by the department. Applicants who have all materials submitted to the Graduate Admissions and Records Office by January 15 will be guaranteed consideration for University of Victoria Fellowships.

In-program student opportunities

The UVic Physics and Astronomy Department has close ties with facilities at world-class organizations both in BC and internationally. This provides many excellent opportunities for our students to work with top physicists and astronomers who are doing ground-breaking research.

Faculty members and area of research

A full list of adjunct faculty is given on the department home page.

Justin Albert, PhD (Princeton)

Experimental nuclear and particle physics

Alan Astbury, PhD (Liverpool)

Experimental nuclear and particle physics

Arif Babul, PhD (Princeton)

Astronomy and astrophysics

Byoung-Chul Choi, PhD (Freie Universität Berlin)

Experimental condensed matter physics

Rogério de Sousa, PhD (Maryland)

Theoretical condensed matter physics

Sara L. Ellison, PhD (Cambridge)

Astronomy and astrophysics

Falk H. Herwig, PhD (Potsdam and Kiel)

Astronomy and astrophysics

Andrew I. Jirasek, PhD (British Columbia)

Medical physics

Dean Karlen, PhD (Stanford)

Experimental particle physics

Richard K. Keeler, PhD (British Columbia)

Experimental nuclear and particle physics

Jody M. Klymak, PhD (Washington)

Physical oceanography

Pavel Kovtun, PhD (Washington)

Experimental nuclear and particle physics

Robert V. Kowalewski, PhD (Cornell)

Experimental nuclear and particle physics

Michel Lefebvre, PhD (Cambridge)

Experimental particle physics

Julio F. Navarro, PhD (Universidad Nacional de Córdoba)

Astronomy and astrophysics

Maxim Pospelov, PhD (Budker)

Theoretical particle physics and cosmology

Christopher J. Pritchett, PhD (Toronto)

Astronomy and astrophysics

Adam Ritz, PhD (Imperial College, London, UK)

Theoretical particle physics

J. Michael Roney, PhD (Carleton)

Experimental nuclear and particle physics

Randall J. Sobie, PhD (Toronto)

Experimental nuclear and particle physics

Geoffrey M. Steeves, PhD (Alberta)

Experimental condensed matter physics

Don A. Vandenberg, PhD (Australian National University)

Astronomy and astrophysics

Kimberley A. Venn, PhD (Texas-Austin)

Astronomy and astrophysics

Arthur Watton, PhD (McMaster)

Nuclear magnetic resonance in solids and liquids

Jon P. Willis, PhD (Cambridge)

Astronomy and astrophysics

Stephenson Yang, PhD (British Columbia)

Astronomy and astrophysics

