Welcome to the Department of Physics

Physics opens the door to a vast range of opportunities, and our vibrant research programme illustrates the range of topics tackled by physicists – and physics students.

Students in many fields need a sound understanding of the physical world. We offer a comprehensive range of courses in physics, and potential specialisations in geophysics, medical physics and imaging technologies, and photonics.

A physics degree provides students with the skills they need to succeed, and our graduates work in a host of interesting jobs in New Zealand and around the world.

Our students work in a supportive and stimulating environment and learn from some of New Zealand’s leading scientists. Auckland physicists are inventing new kinds of lasers, creating innovative technologies to diagnose illnesses in living tissue, understanding the Earth’s changing climate, searching for planets around distant stars, understanding the connections between particle physics and the Big Bang, and much, much more.

Why study with us?

We're the biggest physics department in the country. Our expertise spans the entire world of physics and beyond. And whether your interest lies in pure physics or a multi-disciplinary field, you'll be guided by research-active teaching staff.

The University of Auckland is the highest ranked university in New Zealand by both Times Higher Education and QS rankings.

Cover photo: An exoplanet seen from its moon (artist’s impression). Photo credit: IAU/L Calçada.
Postgraduate study in Physics

**Postgraduate Diploma in Science (PGDipSci)**

**Prerequisite**
- A major in Physics, or equivalent as approved by the Head of Department

**Programme structure**
- 75 points from PHYSICS 625-681, 691, 701-787, 788

And
- 45 additional points from PHYSICS 625-681, 691, 701-787, 788, MATHS 761-763, GEOPHYS 761-763, 780

Or
- At least 15 additional points from PHYSICS 625-681, 691, 701-787, 788, MATHS 761-763, GEOPHYS 761-763, 780 and up to a further 30 points, subject to the approval of the Head of Department, from approved 600 and 700 level courses in related subjects

**Bachelor of Science (Honours) in Physics**

**Prerequisite**
- A major in Physics and at least 90 points at Stage III

Students who wish to take a BSc(Hons) in Physics must have attained at least a B average in 45 points above Stage II in the relevant subject major.

**Programme structure**
- 30 points: PHYSICS 789 Dissertation
- 45 points from PHYSICS 701-788, 791, 792

And
- 45 additional points from PHYSICS 701-788, 791, 792, MATHS 761-763, GEOPHYS 761-780

Or
- At least 15 additional points from PHYSICS 701-788, 791, 792, GEOPHYS 761-780, MATHS 761-763 and up to 30 points from approved 700 level courses in related subjects as approved by the Head of Department
The MPIT programme has been designed with particular input from the Australasian College of Physical Scientists & Engineers in Medicine (ACPSEM) and local industries most likely to recruit graduates.

Several former students have carried out their fourth year projects with Medical Physicists or in the Medical School as well as on industrial projects.

BSc(Hons) in Medical Physics and Imaging Technology

Students who complete the BSc in Physics with a B average or higher in 45 points above Stage II are strongly encouraged to enrol in the BSc(Hons) in Medical Physics and Imaging Technology.

Prerequisites

- A major in Physics and at least 90 points at Stage III

Recommended

On top of the BSc in Physics core papers, it is recommended to have taken: PHYSICS 280, 340, 325 and 326.

Additionally, students who have done the common year in Science can complement their curriculum with these papers from the FHMS schedule: MEDSCI 205, 206 and 309.

Programme structure

- 45 points: PHYSICS 787
- 60 points: MEDSCI 703, 737, PHYSICS 701, 780
- 15 points: MEDSCI 701-740, PHYSICS 701-780, 791, 792

BSc(Hons) in Photonics

Students who complete the BSc in Physics (Photonics theme) with a B average or higher in 45 points above stage II are strongly encouraged to enrol in the Bachelor of Science (Honours) year in Photonics. This additional year of study includes a 45 point research project (usually to be carried out in collaboration with industrial partners) as well as a selection of honours level photonics and communications papers from Physics and Electrical Engineering.

Prerequisites

- A major in Physics and at least 90 points at Stage III

- Students must have completed two of ELECTENG 209, 210 and 303

Recommended

In addition to the BSc in physics core papers, it is recommended to have taken: PHYSICS 340, 325 and 326.

Programme structure

- 45 points: PHYSICS 787
- 30 points: PHYS 726, PHYS 727
- 45 points: PHYS 701, ELECTENG 732, ELECTENG 726, PHYS 731, PHYS 754, PHYS 780
Master of Science (MSc) in Physics

Prerequisite
• A BSc(Hons) or PGDipSci in Physics

Programme structure
• 120 points: PHYSICS 796 MSc Thesis in Physics

Doctor of Philosophy (PhD) in Physics

Entry to PhD
The normal requirement for admission to the PhD is an honours degree with second class honours (division one or better), either MSc, BSc(Hons), or BTech.

The programme typically takes three to four years of full-time study. The first step towards enrolling in a PhD is to identify a research topic or area and talk to prospective supervisors.

Selection of a supervisor
Feel free to contact our academic staff directly to discuss your ideas.
www.physics.auckland.ac.nz/research

“I am interested in the dynamic processes behind water droplet impacts on hard rough surfaces. Use of a high speed camera allows me to record the extremely quick events, and enables me to study the effect of micron scale surface patterns on the spread of water droplets as they impact.

“The programme is very diverse in skills and topics. Fluid mechanics, soft lithography, computer coding, image analysis, high speed photography and experimental setup. It is a good chance to broaden my skills into areas I have not previously worked in.

“I hope to develop my skills as an experimental physicist. I am keen to use my research in a practical way, collaborating with industry to create functional products. I believe that this qualification will help me to become a flexible and adaptive researcher which will be of benefit in industry.”

Matheu Broom is studying toward a PhD in Physics having completed a Master of Physics (Honours).

We are located in the heart of Auckland City, ranked the third best city in the world to live in by the 2016 Mercer Quality of Living Survey.

www.worldranked.ac.nz
## Postgraduate Physics courses

<table>
<thead>
<tr>
<th>Course code</th>
<th>Title</th>
<th>Points</th>
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<tbody>
<tr>
<td>PHYSICS 625</td>
<td>Selected Topics 1</td>
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<tr>
<td>PHYSICS 626</td>
<td>Selected Topics 2</td>
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<td>PHYSICS 681</td>
<td>Experimental Physics</td>
<td>15</td>
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<td>PHYSICS 690A</td>
<td>Graduate Diploma Dissertation (Physics)</td>
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<td>PHYSICS 701</td>
<td>Linear Systems</td>
<td>15</td>
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<td>PHYSICS 703</td>
<td>Advanced Quantum Mechanics</td>
<td>15</td>
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<tr>
<td>PHYSICS 705</td>
<td>Advanced Electromagnetism and Special Relativity</td>
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<tr>
<td>PHYSICS 706</td>
<td>Quantum Field Theory</td>
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<td>PHYSICS 707</td>
<td>Inverse Problems</td>
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<tr>
<td>PHYSICS 708</td>
<td>Statistical Mechanics and Stochastic Processes</td>
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<td>PHYSICS 726</td>
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<tr>
<td>PHYSICS 727</td>
<td>Optoelectronics and Communications</td>
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<td>PHYSICS 731</td>
<td>Wave Propagation</td>
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<td>PHYSICS 732</td>
<td>Fluid Mechanics and Applications</td>
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<tr>
<td>PHYSICS 754</td>
<td>Condensed Matter Physics</td>
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<td>PHYSICS 756</td>
<td>Nuclear Physics</td>
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<td>PHYSICS 760</td>
<td>Quantum Optics</td>
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<td>Advanced Imaging Technologies</td>
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<td>PHYSICS 788</td>
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For course descriptions and more information, go to [www.physics.auckland.ac.nz/pg](http://www.physics.auckland.ac.nz/pg)
Research areas in Physics

**Fundamental Physics, Particle Physics and Astrophysics**

When investigating the fundamental properties of the physical universe, we combine strengths in early universe cosmology, LHC-based heavy ion physics, stellar evolution, and searches for extrasolar planets.

**Complex Systems: Biophysics, Condensed Matter and Complexity**

Research at the University of Auckland connects condensed matter physics to the physics of complex systems in ecology and the social sciences, and engages with the growing field of data science.

**Physics of Atoms, Molecules and Optics**

Our research focuses on interactions between light and matter – from fundamental quantum mechanics to the use of powerful lasers in material processing. Our graduates are equipped for both industrial and academic careers.

**Physics of the Environment**

The department’s geophysicists tackle questions including seismology to climate science. Support for this crucial research comes from government agencies, industry collaborations and private philanthropy.

**Physics of Measurement and Materials**

University of Auckland physicists identify and develop new technologies, techniques, and materials. With a strong record of innovation, the department has provided a spring-board for several successful spinout companies.

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**Research profile**

*My principal research area is biophotonics, using light to image and understand physiological and biological processes. Amongst other projects, my team is working on a testing method in which bacteria are tagged with a fluorescent dye. We aim to obtain the exact bacterial concentration by accurately measuring the light coming from the sample – in five minutes, compared with the current three-day plate count.*

_Dr Frederique Vanholsbeeck_, Senior Lecturer

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**Disclaimer**

Although every reasonable effort is made to ensure accuracy, the information in this document is provided as a general guide only for students and is subject to alteration. All students enrolling at the University of Auckland must consult its official document, the University of Auckland Calendar, to ensure that they are aware of and comply with all regulations, requirements and policies.
Helpful information

Academic dates  www.auckland.ac.nz/dates
Accommodation  www.accommodation.auckland.ac.nz
Apply for postgraduate study  www.auckland.ac.nz/applynow
Career Development and Employment Services  www.cdes.auckland.ac.nz
Childcare  www.auckland.ac.nz/childcare
Degree planning and course advice  www.science.auckland.ac.nz/student-centre
Disability Services  www.disability.auckland.ac.nz
How to enrol  www.auckland.ac.nz/enrolment
Information for postgraduate students  www.postgraduate.ac.nz
International students  www.international.auckland.ac.nz
Libraries and Learning Services  www.library.auckland.ac.nz
Māori and Pacific students  www.science.auckland.ac.nz/tuakana
Need help?  www.askauckland.ac.nz
Postgraduate Students’ Association  www.pgsa.org.nz
Rainbow Science Network for LGBTI students  www.science.auckland.ac.nz/rainbowscience
Scholarships, awards and fees  www.scholarships.auckland.ac.nz
www.auckland.ac.nz/fees
www.auckland.ac.nz/studentloansandallowances
Support for science students  www.science.auckland.ac.nz/support

Questions about Physics? Please email Viji Sarojini (v.sarojini@auckland.ac.nz).

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