

STUDY GUIDE 2016-2017

PHYSICS and APPLIED PHYSICS

Master Programmes

UNIVERSITY OF GRONINGEN

Faculty of Mathematics and Natural Sciences
Graduate School

The information in this study guide can also be found on the [Internet](#):

More detailed information, such as timetables of classes and examinations, can also be found through this Internet address.

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1 General Information

1.1 Introduction

This study guide contains information on programmes, facilities, important university offices, financial matters, rules and regulations etc. for master students in Physics and Applied Physics in the academic year 2016-2017. This information can also be found online for [Physics](#) or [Applied Physics](#).

In case of individual situations or circumstances for which this study guide does not provide sufficient information, it is advised to consult the academic advisor.

1.2 Degrees in Physics and Applied Physics

The University of Groningen offers the opportunity to study Physics as well as Applied Physics. Graduates of these Master's programmes are awarded the degree Master of Science (MSc.). The legally equivalent Dutch degrees are "Doctorandus (Drs.)", in case the master's programme in Physics is completed, and "Ingenieur (Ir.)", in case the master's programme in Applied Physics is completed.

1.3 Graduate School

The Faculty of Mathematics and Natural Sciences comprises an undergraduate school (USS), a graduate school (GSS), an education support centre (ESC) and thirteen research institutes.

In the field of Physics and Applied Physics the following centres of research are important

- Zernike Institute for Advanced Materials (ZIAM)
- Energy and Sustainability Research Institute Groningen (ESRIG)
- Van Swinderen Institute for Particle Physics and Gravity (VSI)
- Nuclear Accelerator Institute-Centre for Advanced Radiation Technology (KVI-CART)

The greater part of the scientific staff in the field of (applied) physics is active in one of these research institutes, while taking part in teaching activities of the undergraduate and graduate school. The Master programmes Physics and Applied Physics are part of the graduate school.

The board of the graduate school is directly or indirectly responsible for all matters concerning the programme which have been delegated by the board of the faculty to the board of the graduate school.

For the Master programmes Physics and Applied Physics the person responsible is:

- prof.dr.ir. P.R. Onck (adjunct programme director)

1.4 Supportive staff and committees

Supportive Staff

- Drs. G.J. Zondervan (academic advisor)
- N. Bos, MSc (programme coordinator)
- Ms. A.H.J. van der Born (Education Support Desk)
- Dr. R.J.H. Klein-Douwel (coordinator practicals)
- H. de Vries (Technical education assistant)

Course Committee (opleidingscommissie, OC)

Matters related to the course curriculum are discussed in the Course Committee. The Course Committee has an advisory responsibility with respect to the content of course programmes, with respect to the evaluation of course units and with respect to various other educational issues that may arise. The Course Committee also reviews the Teaching and Examination Regulations (OER) annually. The committee advises to the Board of the School of Science and Technology, to the Board of the Faculty or to individual professors.

The course committee consists of six staff members and six student members, but also the adjunct director of education, the study advisor and the programme coordinator generally attend the meetings of the committee. Student members of the OC are elected annually; staff members hold office for two years.

- Prof.dr. M.A. Loi (chairman)
- N. Bos, MSc (secretary)

Board of Examiners

The Board of Examiners is responsible for examinations and checks whether individual student have met the requirements for graduation. Also the admission of foreign students and the individual adaptations of the degree programme are the responsibility of the Board of Examiners.

- Prof.dr.ir. E. van der Giessen (chairman)
- N. Bos, MSc (secretary)

1.5 Student Organizations

Fysisch-Mathematische Faculteitsvereniging (FMF)

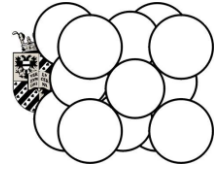
The FMF is the student association for students in (Applied) Physics, Astronomy, (Applied) Mathematics and Computer Science. The FMF organizes several formal activities as well as informal activities such as parties and sports events. Every month the FMF organizes a free cinema and borrels (informal drinks). The FMF also organizes study related activities; symposia, talks and study trips. Do not hesitate to visit us or join activities!



Office: Nijenborgh 4 - room 5111.0053 (behind the cafeteria)
Tel.: +31 (0) 50 - 363 4155
E-mail: Bestuur@fmf.nl
Internet: www.fmf.nl

Technisch Fysische Vereniging 'Professor Francken'

The student association 'Professor Francken' is the association for Applied Physics students. Currently, Professor Francken has approximately 750 members. On week days you can visit the large Francken room where you can drink coffee, have lunch, study, relax and play games with fellow students. Francken lets you orientate on the business and research involved with applied physics. The Francken study room and practice sessions help you pass your exams, while outside the tense periods a lot of fun activities are organized.



Office: T, Nijenborgh 4 – room 5113.0002/5113.0006
Tel. +31 (0) 50 – 363 4978
E-mail: bestuur@professorfrancken.nl
Internet: www.professorfrancken.nl

'Nederlandse Natuurkundige Vereniging' (NNV)

The NNV is the national association for physicists. Membership of the NNV for students costs € 11,50 a year. This includes a subscription for the 'Nederlands Tijdschrift voor Natuurkunde'. To subscribe for membership, go to the website www.nnv.nl.



Address: P.O. Box 41882, 1009 DB Amsterdam,
Tel.: +31 (0) 20 – 592 2211,
E-mail: bureau@nnv.nl
Internet: www.nnv.nl

Koninklijk Instituut Van Ingenieurs (KIVI)

KIVI is the Dutch association for engineers and engineering students. With 20.000 members KIVI is the largest engineering association in the Netherlands. All engineering disciplines are organized within KIVI. As the network body for engineers and other highly educated technical professionals in the Netherlands, KIVI's primary objective is to promote the importance of technology in our society. This ensures continuity in adequate investment in education, research and innovation. To meet this objective, KIVI conducts the following core activities:



- Technical promotion – to promote the role of technology and engineers in general
- Network – to stimulate contacts and exchange of knowledge between engineers
- Member services – to provide services that assist members with the development of their professional careers

KIVI provides professional services to its members all over the world and organizes a large number of activities throughout the year. Of course this also counts for engineers from abroad who wish to work or study in the Netherlands. On this website you will find information about our policies and services and the many advantages of a KIVI membership.

If you have any questions please contact the KIVI office in Den Haag.

Tel: +31 (0) 70 – 391 9900;
E-mail: info@kivi.nl
internet: <http://www.kivi.nl>

1.6 House rules, regulations

Every student receives safety regulations for the labs of Nijenborgh 4 in the form of the 'Information Guide Nijenborgh 4'. Students are expected to live up to it.

Opening hours building

The main entrance of the building is open from Monday up to and including Friday between 08.00 and 18.00 hour. Other entrances are only available using an entrance card. At weekends and holidays the building can be entered and left using a valid entrance card. Such an entrance card can be handed out to students during the research period of their studies. The application procedure is described in the 'Information Guide Nijenborgh 4'

Fire and accidents

In case of fire and accidents call **8050** and clearly explain the situation and location.

Equipment in operation

Equipment and experiments are only allowed to be in operation outside duty hours in urgent cases. One is required to take care of optimal safeguarding to prevent calamities caused by external malfunctioning.

Furthermore, when leaving equipment running, one is required to fill out a special form (aanlaatformulier) in duplicate. One copy should be present and visible at the specific equipment; the other copy should be handed over to the porter. In case the special form is not filled out at the right location, the porter is compelled to report this and take necessary measures.

The forms for leaving equipment running (aanlaatformulier) are available at the porter's. The forms are valid for a maximum of four weeks. Hereafter, possibly a new form has to be filled out.

Insurance

All students are insured via the university. This insurance consists of a collective accident insurance in combination with a collective third-party insurance during presence on grounds and in buildings (including labs) of the Rijksuniversiteit Groningen.

Food and drinks

Food and drinks are strictly forbidden in the labs, as is drinking from laboratory glassware. Storage and handling of food in or with laboratory equipment, e.g. refrigerators, ovens, etc., are also forbidden.

1.7 Computer screens and RSI

Many students spend a lot of time in front of computers and are at risk of developing RSI-troubles. RSI is the abbreviation for Repetitive Strain Injury and is a generic term for all troubles involving neck, shoulders, arms, wrists and hands. These troubles can become chronic and lead to incapacitation for work and serious limitations in everyday life.

Symptoms

RSI symptoms can vary from stiffness, pain and tingling sensations to loss of strength in the above mentioned body parts. Initially the symptoms occur only during work in front of screens, but at a later stage they occur also when at rest. Eventually the troubles might occur continuously, causing pain at even the simplest of actions or making them completely impossible.

How to prevent RSI?

- Do not work at a computer for more than 6 hours a day

- Regularly relax your shoulders
- Sit up straight, use the arm rests
- Hold the upper arms vertically along the upper body
- Place the monitor, keyboard and document holder right in front of you
- Keep your wrists straight, if necessary by means of a wrist support or ergonomic keyboard

When using a mouse:

- Make the movements from your elbow rather than from your wrist
- Operate the mouse with your other hand every now and then
- Place the mouse close to you.

2 Facilities

2.1 Libraries

2.1.1 University Library (UB)

The UB functions as facility centre for the entire university community; for both the faculty- and institutional libraries and the library users.

The UB offers students many services. It contains more than 2.4 million books and articles. There are around 1600 places for study. Furthermore, the library holds a vast collection of references and educational material. About 30% of these are available at the study rooms. The remaining material is kept at closed depots. The material can be accessed via the loan facility. For further information and services of the UB one may refer to the [website](#).

University library
Broerstraat 4
9712 CP Groningen
<http://www.rug.nl/bibliotheek/services/ub>
tel.: +31 (0)50 – 363 5020

2.1.2 Library at Zernike Campus

The Duisenberg Building (building number 5411) houses the library for the faculties of Mathematics and Natural Sciences, Economics and Business, and Spatial Sciences. This library is on the 2nd floor, above the Student Plaza. In this library you can look for literature in one of our discipline-related collections, borrow or return books, or simply have a quiet place to study. You can also get library instructions at our library (how to look for scientific information) and workshops (incl. RefWorks). Visit us sometime and get to know our library and what we can offer you as a student; you are always welcome!

For current opening times, address details and a range of scientific information and workshops, please go to the [website](#). Here you will find both general and location-specific information.

General Information:

- Your student pass is also your library pass. You can use it to borrow books.
- You can search the collections and extend the loan period of borrowed books using the catalogue (catalogus.rug.nl).
- Borrowed material may be returned to any branch of the University Library.
- You can also access almost all the electronic files and collections (e-journals, e-books) outside the campus via the proxy-server.
- You can e-mail any questions to: bibliotheek@rug.nl

2.2 Computer facilities provided by the university

Account

With your enrolment as a student of the university you will receive a letter or email with a student number and a preliminary password to access a computer account called the UWP (Universitaire WerkPlek).

This initial password gives access to the [Password Self Service Portal](#). Please change your initial password directly after receiving the Password Self Service Portal. You can then log on to the e-mail and other computer facilities of the University of Groningen.

A student-account basically provides a number of common services all accessible with one username and password:

- access to the central servers for use of MS-Windows based applications
- access to the Internet and remote storage facilities
- an e-mail account
- access to MyUniversity
- access to Nestor (the electronic learning environment of the Rijksuniversiteit Groningen)
- and access to ProgRESS WWW where you can register for courses and exams or monitor your study progress.

E-Mail, Calendar, Drive (of Google Apps for education)

Your login name is your student number prefixed by an 's'.

Students usually access their mail with a web browser but mail can also be read using mail protocol IMAP (or via an app).

ProgRESS WWW

ProgRESS WWW is a web application designed for students who want to access their course results or want to register for courses and exams.

You need to register in ProgRESS WWW for both courses and exams. The deadline for registering for a course is four weeks before the start of the course, for an exam the deadline is one week before the exam takes place.

A few days after a final grade has been registered by the administration office, the grade will also appear on ProgRESS WWW. If you need an official transcript (grade report), you can print the course results and ask a secretary in the administration office for a stamp and signature.

Student Portal

The Student Portal provides the electronic learning environment (ELO) of the University of Groningen. You can log in to My University with your P- or S-number.

Part of the student Portal is Nestor which contains information provided by the lecturer like lecture notes, assignments and other relevant documents. It has a *Discussion Board*, a forum used by students to exchange information and a *Drop Box* to share files with fellow students such as a group assignment that has to be reviewed by students in your group. After registering for a course in ProgRESS WWW you will automatically be enrolled in the corresponding Nestor course.

My University

My University contains all the information for staff and students of the University of Groningen. You can log in to My University with your P- or S-number.

My University is your personal Dashboard that is partly occupied by information that everyone needs to access. Via your Dashboard all information from your RUG-mail, the RUG-planner, Progress and Nestor is easily accessible. You can furnish your Dashboard exactly the way you like with the help of so called widgets, e.g. Facebook, Twitter, Buienradar or OV9292. More information about save use of My University can be found [here](#).

Ocasys

Ocasys is the university course catalogue. It contains short descriptions of course contents, necessary literature, etc.

Student PCs

Nijenborgh 4 has six computer rooms (5116.0310, 5116.0303 and 5116.0315, 5113.0303, 5113.0306, 5111.0010) with around 90 computers for all students. Using these PCs you can log onto the university network. You will then have access to applications, your own data on the home directory (X:\) and the internet. Some of the

rooms are used for practicals and courses, but when these are not scheduled the rooms are available for self-study.

Printing

Around most large computer rooms printers are available. Prints need to be paid with your University Card (RUGpas). You can top up the credit via the internet with MyOrder or Webdeposit. This is explained step-by-step on the [website](#). The price of a copy/print with this system is:

- 1,6 cent black and white
- 5,7 cent for colour

More information and conditions

For more information about network, security, available applications, helpdesk etc., have a look at the website of the [IT facilities](#).

Finally there are conditions on the use of these facilities. You can read these [here](#).

All students are expected to know these conditions and to live up to them. Abuse will be punished with exclusion of all facilities for a certain time.

3 Study Affairs

3.1 Academic calendar

The academic year 2016/2017 starts on September 1 2016 and ends on July 10 2017. The academic year consists of two semesters each consisting of two quarters of ten or eleven weeks. The second semester starts at February 6 2017. Vacations are from the second week of July until the last week of August and the two weeks including Christmas and New Year.

Information on timetables can be found on the [website](#).

3.2 Information channels

Timetables of lectures and exams

To get the latest detailed information on time and location of lectures, practicals and exams, you can go [here](#) for both Physics and Applied Physics courses.

Mail/Notice

In some cases messages of importance are sent to the electronic mailbox of the students or groups of students, like requests to sign up for certain courses or alterations in the timetables. For this reason, the students are expected to check their mailbox on a regular basis (at least once a week!).

Academic advisor

See section 3.4

University paper (Universiteitskrant, UK)

The UK is an independent news medium of the university of Groningen. It has a [news site](#), digital magazine and a weekly newsletter. Apart from editorial articles of general interest concerning the university community the UK publishes important announcements. The Board of Executives (College van Bestuur) frequently publishes the central rules and regulations in the UK.

3.3 Study and finances

Tuition fees

You can only participate in the Master programme as a full-time student. For EU students the annual tuition fee amounts to € 1984,-. For non-EU students the fee amounts to € 13900,-.

When you already have a Master degree and want to do a second Master programme other fees will apply. You can find these [regulations and fees](#) and more information on the website.

Fees do not include travel, accommodation, living and incidental costs (about € 8000,- per year). The Housing Office assists foreign students in finding accommodation.

Deadline for applications

Applications for admission for international students to the MSc-programme in Physics and Applied Physics by foreign students should be completed as early as possible, but should have reached the university admissions office (admissions@rug.nl) before April 1st (non-EU students) or May 1st (EU students).

Check the website for [application deadlines](#) and for more information about [how to apply](#). The first step in the application procedure is registering at [Studielink](#).

Study expenses

Costs of textbooks and educational tools are relatively low. For the master programme € 1000,- will cover most of the compulsory textbooks, manuals, practical materials, excursions, etc. The University of Groningen has a policy on study costs. The policy aims to control costs so that the 'study cost' component does not exceed grant/loan budgets for Dutch students. The amount that students are required to spend on study materials will therefore not exceed the government grant. The standard sum for 2016-2017 is € 650,-. Each course phase has a cost 'ceiling' (standard sum x length of course).

Sometimes it is not possible to avoid going beyond the ceiling amount. In such cases it is possible to apply to the Faculty Board for reimbursement of half the extra expenditure on the basis of receipts submitted as proof. Sometimes another arrangement may be possible.

On the website an [overview of the costs](#) of studying in Groningen can be found. Students can also visit the University Student Desk or their academic advisor.

The direct study costs for the master programme in Physics and Applied Physics are estimated well below the maximum (appr. € 500,- per year).

3.4 Academic advisor

The main task of the academic advisor is to provide assistance to students experiencing personal and academic problems. In practice, issues such as choice of courses, study methods, choice of (future) specialization, optional courses, thesis research and career perspectives are most discussed. The academic advisor can also provide assistance or help in financial matters (for instance in case of delay) or personal issues. Academic advisor for Physics and Applied Physics is drs. G.J. (Geartsje) Zondervan:

Room: 5161.0049 (Bernoulliborg)

Tel.: +31 (0) 50 – 363 4130

E-mail: G.J.Zondervan@rug.nl

3.5 Teaching Assistantship

Senior students have the opportunity to gain valuable experience as a teaching assistant. Teaching assistants mainly teach exercise classes or assist during computer sessions or practicals. Also, grading homework or exams may be a task of teaching assistants. Of course the teaching assistant is paid for his services.

Students interested in a teaching assistantship can gain more information from the student counsellor or wait for an e-mail call from the programme or practical coordinator.

3.6 Honours College

"Leadership: making the difference"

If you are looking for an extra challenge during your Master's degree, the master's Honours Programme organized by the University of Groningen Honours College might be just what you're looking for. The programme yearly offers 250 students, that are able and willing to excel, the possibility to deepen their theoretical knowledge about leadership and to improve their leadership skills. The programme is extracurricular and has a workload of 15 ECTS (in one year).

A place in the Honours College will offer you the possibility to enjoy additional, challenging and small-scale education from an interdisciplinary perspective. Also you will meet motivated fellow students and prominent scientists and you can participate in a variety of interesting complementary activities. This programme will provide a solid starting point for your future scientific or social career and it will contribute to your personal development.

Application

Application is possible twice a year (August and January). Students who want to follow the Master's Honours Programme should have a Bachelor's degree by September 1st or February, 1st with good to excellent results, including a Bachelor's thesis (or another project to finish a Bachelor Programme) marked above average.

Considering there are limited places, there will be a selection procedure. In the selection procedure you will be assessed on the following points:

- your grades obtained so far;
- your motivation to participate in the Master's Honours Programme;
- the potential to complete the Master's Honours Programme within the period specified (one year).

On the website more information about the [Honours Master](#) and [application and selection](#) is given or you can send an e-mail to: honours@rug.nl.

3.7 Kamerlingh Onnes Award

The Kamerlingh Onnes Award is granted annually shortly after September 1st to the graduate with the best academic record. The winner is chosen by a committee constituted from the members of the Board of Examiners. The winner is invited for a lecture in the framework of the General Physics Colloquium. The prize consists of a stipend of € 1250,- for a study trip and an award certificate.

3.8 Study Abroad

All master students are in principle eligible to studying abroad. There are a several possibilities such as:

- Following courses at a foreign university
The University of Groningen has exchange agreements with a number of foreign universities, which means that no fees will be raised if Groningen students study there for a mobility period.
- Research project at a foreign university
Generally this should be done in a research group abroad with existing ties with the research group in which you are doing your final research project. Contact your thesis supervisor for the possibilities.
- Internship in a company abroad.
Students in Applied Physics may do their industrial internship in a foreign company. Also in this case: Contact your thesis supervisor to consider the possibilities.

More information about studying abroad can be found on the [website](#) or consult the academic advisor (see section 3.4). The academic advisor is also the coordinator for studying abroad.

Financing the study or internship abroad

There is a number of programmes to finance your study or internship, and for travel expenses for internships - in case these are not paid for by the company, such as Socrates/Erasmus for study at a university within the EU, Marco Polo for all other destinations. You might also get a contribution from the [Groninger Universitair Fonds](#) (GUF).

Important websites for general information and how to finance your study or internship are:

www.wilweg.nl

www.nuffic.nl

www.beursopener.nl

3.9 Examinations (tentamens)

Timetable

The [examination timetables](#) give the dates for written examinations of the individual course units.

Usually an examination is scheduled at the end of the quarter in which the course unit has been offered. Students are allowed to take the examination of a particular course unit two times per year. The timetables of examinations are liable to change, so students should check the website regularly.

Enrolment for exams

Students should enroll for written exams through [ProgressWWW](#) at least one week before the examination date. If you do not sign-up before this date, you are not allowed to take the examination. As from the year 2014/2015 the enrolment for the courses is automatically booked through as an exam enrolment.

If you cannot take part after all, you can cancel the enrolment until one day before the examination date.

Procedures during exams

There are some rules and procedures during the exams:

- Students are required to show their student card at written exams.
- Graphing calculators are not permitted unless this is explicitly allowed by the lecturer of the course. Electronic pocket calculators without graphic display are allowed.
- Students are obliged to follow the directions of the surveillants of the exam.

Fraud

Any act of a student to mislead the examiner in such a way that a correct evaluation of the students' knowledge, insight or competences is prevented, is considered as fraud.

Examples of fraud are:

- the use of crib notes (on paper or digital);
- plagiarism (also the use of internet files without proper reference is considered as fraud);
- 'free riding' on the work of fellow students in group assignments;
- copying (laboratory) reports from fellow students;
- falsifying experimental data;

In case of fraud the Board of Examiners can exclude a student from participating in the particular exam for a period of one year.

Registration of Examination results.

Examination results are processed by the Education Support Centre (ESC). Students can look at their achieved results through [ProgressWWW](#). Approximately twice a year all students receive a certified printout of their results.

In case an official list of results is needed in between, a certified list of results can be obtained at the Education Support Desk, located at the entrance of the study area in the Bernoulliborg, or by sending an e-mail to esc.fwn@rug.nl.

3.10 Graduation

Enrolment procedure for graduation

1. Approval by the Board of Examiners

Prior to a request for graduation the Board of Examiners considers the list of results on the course units that are part of the degree programme. The student should complete a form with the results obtained on the approval form for graduation. The form can be filled in within [ProgressWWW](#).

Only after approval by the Board of Examiners a request for graduation can be filed. The request for approval of the programme should be filed at least six months before the intended graduation date.

2. *Research thesis*

Together with the request for graduation Electronic versions of final research reports should be placed in the [repository](#) of the library. This makes the report available for the public. More information about the repository can be found on the [website](#).

Graduation is only possible for enrolled students. It is strongly advised that the student files a request for graduation as soon as all requirements of the curriculum have been met, in order to prevent unnecessary tuition costs.

Graduation ceremony

The graduation ceremony usually takes place in the Academiegebouw, Broerstraat 5. After proper registration the student will receive a schedule with time and place of the ceremony.

At the graduation ceremony the graduate receives a graduation certificate together with a diploma supplement stating the grades on the separate course units.

Usually the graduation date coincides with the date of the graduation ceremony. In some cases (usually around September 1) the graduation ceremony may be postponed to September. This may be the case when the last examination results are obtained in the last weeks of August and the administrative procedures for graduation cannot be timely fulfilled before August 31 (i.e. before the end of the academic year). When the examination results do so permit, the graduation date can be set at August 31, whereas the graduation ceremony takes place in September.

For the timetable of the graduation ceremonies one should refer to the [student portal](#).

3.11 Rules and regulations

Many things treated in this study are based on formal documents approved on the basis of the Higher Education Act by the board of the university, the board of the faculty, the faculty counsel or by the board of examiners. In case of doubt or in case of conflicts it is advisable to refer to these formal documents. Of importance are the following:

3.11.1 Student charter

The Student Charter provides an overview of the rights and obligations of both students and the University. It is based on national legislation, particularly the Higher Education and Research Act (WHW), supplemented by regulations that are specific to the University of Groningen. These latter regulations are set out in the appendices to the Student Charter.

The Act stipulates that the Student Charter comprises two sections: a university-wide section and a programme-specific section.

The *university-wide section* describes the rights and obligations that apply to the university as a whole, such as registration and protection of rights. You can find this section on to the [student portal](#).

The university-wide section of the Student Charter does not literally quote the articles from acts and regulations but describes them as clearly as possible. The various topics are accompanied by links to the relevant articles of the act or regulation in question.

The *programme-specific sections* describe the rights and obligations that apply to specific degree programmes. These sections include the Teaching and Examination Regulations (OER), Rules and Regulations for examinations and final assessment and

other regulations and provisions set by the various degree programmes and faculties. You can consult your programme-specific section at the faculty Education Offices and in the Study Guides.

Applicability

The Student Charter applies to academic year 2016-2017. The university-wide section of the Student Charter is approved annually by the Board of the University and endorsed by the University Council. In the event that the Charter challenges or contradicts any legal regulations, these legal regulations will take priority.

Publication

At the start of the academic year all students will be sent an e-mail by the Board of the University informing them where they can find the Student Charter on the internet and where they can consult a hardcopy of the Student Charter.

Using the Student Charter

All students are expected to be familiar with the contents of the Student Charter. Not complying with the rules in the Charter may affect your rights, for example the right to financial support from the Graduation Fund.

Some of these regulations may not be as hard and fast as they sound. Rules and regulations are by definition general in character, and this Student Charter is no exception. This means that the applicability of these regulations in concrete situations and individual instances is not always a predictable and straightforward matter. Students who have registered for the first time this year may find that the regulations that apply to them are different to those for students who have reregistered. Make sure you are provided with the right information by your faculty and/or the Student Service Centre (SSC) and read the Student Charter and the associated regulations carefully!

Items in the Student Charter

The university-wide section of the Student Charter contains information on the rights and obligations of students regarding the following items:

- admission,
- registration and deregistration,
- teaching, including the binding study advice,
- examinations and final assessments,
- financial assistance,
- consultative participation,
- rules of behaviour,
- legal rights.

3.11.2 Teaching and Examination Regulations (OER)

The Teaching and Examination Regulations is established by the board and council of the faculty.

It contains a number of regulations with respect to structure and content of the educational programmes, form and frequency of examinations, admission regulations, tutoring etc.

The OER can be found on the [student portal](#).

3.11.3 Rules and Guidelines of the Board of Examiners

The Rules and Guidelines of the board of Examiners contain a number of additional regulations concerning examinations: e.g. registration for examinations, procedures for exemptions, assessment, fraud, etc.

[The Rules and Guidelines of the Board of Examiners](#) for the MSc in Physics programme can be found on the infonet.

3.12 Objection and appeal procedures

When applying rules and regulations, mistakes are sometimes made. This is why the Students' Charter (Studentenstatuut) covers provisions to ensure lawful protection of the student. If students feel unjustly treated, they can object and lodge an appeal.

The two agencies a student can contact are mentioned in the Students' Charter:

- Higher Education Appeals Tribunal (College van Beroep voor het Hoger Onderwijs). For most matters concerning the central part of the Students' Charter (see section 3.10.1).
- Board of Appeal for the Examinations (College van Beroep voor de Examens). Mostly for matters concerning the decentral part of the Students' Charter (OER). An overview of all objects and appeal procedures can be acquired on to the [student portal](#).

Complaints

There are many situations possible where regulations of the Students' Charter (Studentenstatuut) are not directly violated, but that make the student still feel improperly or unjustly treated. In such a case he/she can file a complaint to the following agencies:

Decentral

Each of the faculties and departments has its own (specific) complaint procedure. The study advisor can offer direct assistance, but he/she could also forward the case to, for example, the head of the Programme Committee (Opleidingscommissie) or to the director of the Graduate School.

Student Service Desk

If one cannot or wishes not to contact the faculty or department, the complaint could be discussed with a student dean at Student Service Desk. He/she will act as ombudsman and mediate, and, if requested, demand inspection of dossiers or contact professionals.

4 Master programmes

4.1 Introduction

To be admitted to the master programme in Physics or Applied Physics, the student must have obtained the prerequisite bachelor degree in respectively Physics or Applied Physics. In case a student does not meet this requirement, but does hold a bachelor degree in a related field, the student can in some cases still be admitted. In this case the student must consult the academic advisor to set up an individual programme to eliminate deficiencies, this programme must be approved by the board of examiners.

The programmes presented in this catalogue pertain to all students who start with their master studies in the academic year 2016-2017.

4.2 Physics

The master programme in Physics comprises two years of full time study, equivalent to 120 ECTS.

Please note that if the student has got a bachelor's degree in Applied Physics, extra requirements to the course curriculum may apply. Courses mandatory in the bachelor's curriculum of Physics, but not in that of Applied Physics, are in such cases mandatory courses for the master's curriculum. The total amount of credits in the curriculum however remains unchanged in such a case.

The programme is offered in two variants, the P-variant and the M-variant.

P-variant and M-variant

P-variant: to graduate as a scientific researcher

M-variant: to graduate for a position in the field of policy and management functions in trade and industry and public authorities, for which scientific knowledge and skills are desirable.

The studies are mostly attended on an individual basis in research projects and/or traineeships at companies/administrative bodies. Furthermore, specific courses have to be taken for each variant.

The P-variant is primarily concentrated on the profession of a researcher. This study concentrates on a continuing research in preparation for a dissertation (PhD). Obviously, students graduating the M-variant have also the opportunity to prepare for a doctor's degree.

Specializations

From September 1st 2013 the P-variant of the Physics Master programme offers two tracks: Advanced Materials and Quantum Universe that focus on research in physics, and the M-variant offers one specialization, Science Business and Policy, that focuses on business and policy. The requirements for these specializations can be found in the following table.

In the following chapter, lists of optional courses can be found along with further information on the specializations. Information on the individual course units can be found in [OCASYS](#).

AM Advanced Materials track
QU Quantum Universe track
B&P Science Business and Policy.

Master's Curriculum Physics	AM	QU	B&P
	ECTS	ECTS	ECTS
Advanced Quantum Mechanics	5	5	5
Characterization of Materials	5		
Computational Physics	5	5	5
Cross-disciplinary Materials Science	5		
Electrodynamics in Radiation Processes		5	
Functional Properties	5		
General Relativity		5	
Introduction Science, Business and Policy			20
Mathematical Methods of Physics	5	5	5
Particle Physics Phenomenology		5	
Optional courses in Advanced Materials	20		
Optional courses in Quantum Universe		20	
Optional Courses in Science			10
Statistical Mechanics	5	5	5
Structure at Macro, Meso & Nano Scale	5		
Student Seminar on Quantum Universe		5	
Internship Business and Policy			40
Research	60	60	30
General Physics Colloquium	p.m.	p.m.	p.m.
Total	120	120	120

- All master students are obliged to attend 10 presentations in the framework of the General Physics Colloquium
- Students who started their bachelor studies before 2006 may have followed a programme that did not contain each of the courses Solid State Physics, Applications of Quantum Physics and Subatomic Physics. However all three courses should be taken, either as part of the bachelor or as part of the master programme. In case any of these courses is not taken as part of the bachelor programme it is obligatory to take this course as part of the master programme. The credits are to be taken from Optional courses in Science.
- Some of the other courses in the list may have been part of the bachelor programme, e.g. as part of the free minor. In this case the credits allocated in this table to such a course should be transferred to Optional courses in Science
- It is advised to choose one or more of the optional courses in the field of the research group in which the final research project is performed (cf. Chapter 5).
- Information on the individual course units can be found in [OCASYS](#)
- In the following chapter, lists of optional courses can be found along with further information on the specializations.

4.3 Applied Physics

The Master programme in Applied Physics comprises two years of full time study, equivalent to 120 ECTS.

To be admitted to the master programme in Applied Physics, the student must have obtained the prerequisite bachelor degree in Physics or Applied Physics.

Please note that if the student has got a bachelor degree in Physics, then extra requirements to the course curriculum apply. Courses mandatory in the bachelor curriculum of Applied Physics, but not that of Physics, are mandatory courses for the master curriculum. The total amount of credits in the curriculum remains the same.

The requirements of the programme Applied Physics are as follows.

Master Curriculum	Applied Physics
	ECTS
Characterization of Materials	5
Computational Physics	5
Cross-disciplinary Materials Science	5
Functional Properties	5
Mesoscopic Physics	5
Mechanical Properties	5
Structure at Macro, Meso & Nano Scale	5
Optional courses in Science	15
Internship in Industry	20
Courses in Business and Management	5
Applied Physics Research	45
General Physics Colloquium	p.m.
Total	120

- All master students are obliged to attend 10 presentations of the framework of the General Physics Colloquium.
- Some of the other courses in the present master programme may have been part of the bachelor programme, e.g. as part of the minor or as part of an older version of the bachelor programme. In this case the credits allocated in this table to such courses should be transferred to Optional courses in Science
- It is advised to choose one or more of the optional courses in the field of the research group in which the final research project is performed (cf. Chapter 4.5).

4.4 Course descriptions

The electronic course catalogue OCASYS contains descriptions of all course units that are offered by the University of Groningen. The url of OCASYS is: <http://www.rug.nl/ocasys>

4.5 Lists of Optional Courses

Below a list of optional courses that can be chosen – if not part of the obligatory programme - without any further permission by the Board of Examiners.

Optional courses in Quantum Universe

	(ECTS)
Big Experiments	5
Cosmic structure formation	5
Elementary Particles	5
Fundamental Constants	5
Formation and Evolution of Galaxies	5
Geometry and Differential Equations	5
Geometry and Topology	5
High-Energy Astrophysics	5
Introduction to plasma physics	5
Lie-Groups in Physics	5
Quantum field theory	5
Star and Planet Formation	5
Statistical Methods in Physics	5
Stellar Structure and Evolution	5

Optional courses in Advanced Materials

	(ECTS)
Atomic and Molecular Interactions	5
Many-Particle Systems	5
Mesoscopic Physics	5
Micromechanics	5
Modern Laser Microscopy	5
Non-Linear Optics	5
Mechanical Properties	5
Physics of Lasers	5
Polymer Physics	5
Statistical Methods in Physics	5
Statistical signal processing	5
Surfaces and Interfaces	5
Theoretical Condensed Matter Physics	5
Ultrafast Time-Resolved Spectroscopy	5

Optional courses in Applied Physics

<i>Theoretical Physics</i>	(ECTS)
Advanced Quantum Mechanics	5
Atomic and Molecular Interactions	5
Non-linear Optics	5
Statistical Methods in Physics	5
Theoretical Condensed Matter Physics	5

<i>Applied Physics</i>	(ECTS)
Mechatronics	5
Micromechanics	5
Modern Laser Microscopy	5
Robotics	5
Statistical Signal Processing	5

<i>Other advanced Physics courses</i>	(ECTS)
Molecular Dynamics	5
Radiation Physics	5
Surfaces and Interfaces	5
Physics of lasers	5
Ultrafast Time-Resolved Spectroscopy	5
<i>Advanced Mathematics courses</i>	(ECTS)
Calculus of Variations and Optimal Control	5
Computational Fluid Dynamics	5
Computational Methods of Science	5
Functional Analysis	5
Numerical Mathematics 2	5
Partial Differential Equations	5
<i>Chemistry and Chemical Engineering courses:</i>	(ECTS)
Polymer Physics	5
Technical Thermodynamics	5
<i>Courses in Business and Management</i>	(ECTS)
Environmental and Resource Economics	5
Global Change A	5
Process Improvement and Change	5
Strategic Management & Technology	5
Sustainability for Engineers	5

5 Further Information on the Tracks

5.1 Advanced Materials Track

The track *Advanced Materials* of the Physics programme is a track under the Zernike Institute for Advanced Materials (ZIAM), and will emphasize the design and scientific study of materials for functionality. The goals of the ZIAM are:

- To attain a position as an internationally recognized, leading, materials research and training institute;
- To conduct research addressing fundamental questions in the fields of functional materials;
- To optimize the synergy and knowledge transfer between the sub-disciplines of physics, chemistry and biology;
- To educate a new generation of researchers in a cross-disciplinary approach to better prepare the graduates for the diversity and quality of skills needed in society.

The exact requirements of the programme are given in Section 4.2.

5.2 Quantum Universe Track

The specialization *Quantum Universe* of both the Physics and Astronomy Master programmes is a collaboration between the Van Swinderen Institute (VSI), the Kapteyn Astronomical Institute and the Centre for Advanced Radiation Technology (KVI-CART). It will emphasize the relations between Theoretical Physics, Particle Physics and Astronomy in the study of nature on different scales.

The exact requirements of the programme are given in Section 4.2. In the figure on the next page, the programme is explained graphically. In the middle of the triangle the five compulsory core Quantum Universe courses are given. In addition to these courses a student must choose (at least) three elective Quantum Universe courses: in each corner of the triangle two courses of special interest for respectively Theoretical Physics, Experimental Physics, and Astrophysics are denoted, furthermore along each base of the triangle three courses of mutual interest for the fields mentioned in the adjoining corners are denoted.

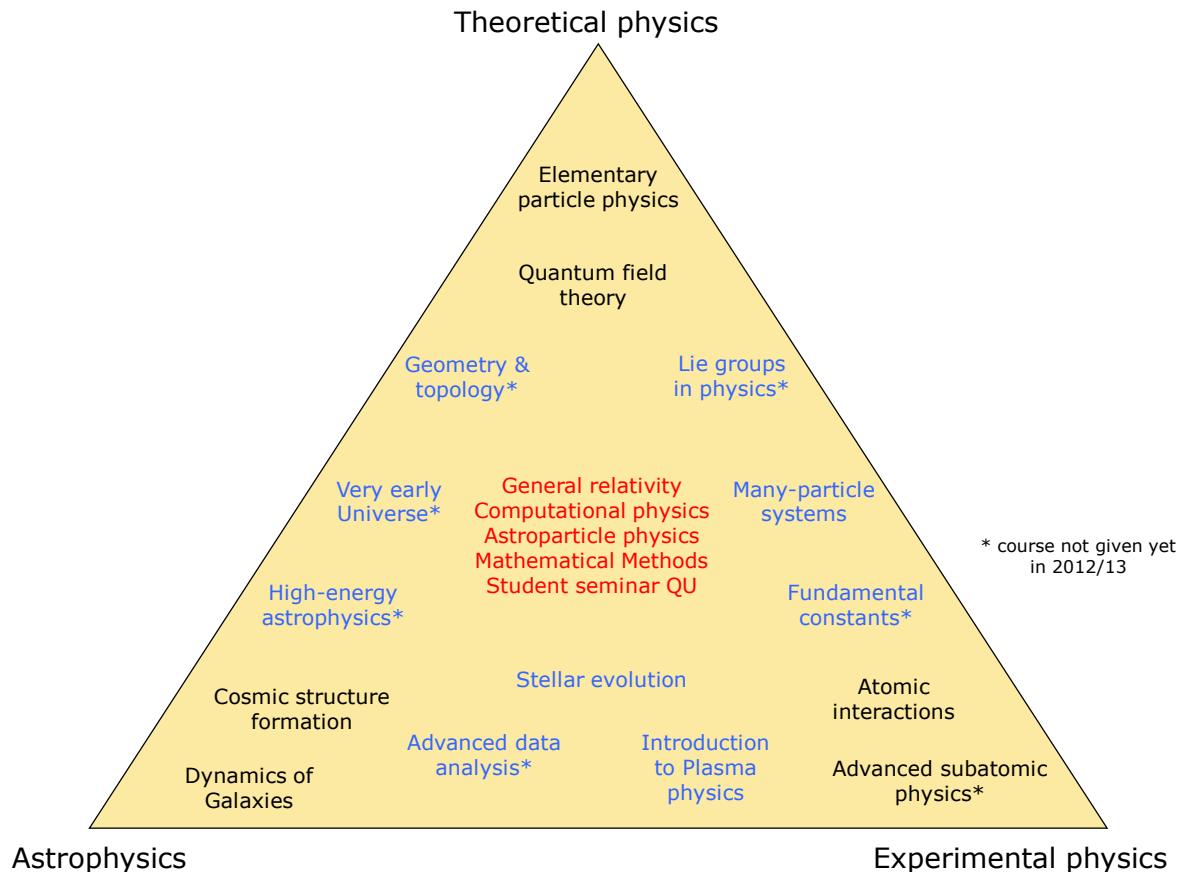
5.3 General Information

Academic advisor

The academic advisor is drs. G.J.Zondervan. See section 3.4 for more information.

Master's Research Project

In general, Advanced Materials students carry out the Master's research project in one of the research groups in experimental physics of the Zernike Institute for Advanced Materials (ZIAM).



Quantum Universe students carry out the master's research project at research groups at the Van Swinderen Institute (VSI), the Energy and Sustainability Research Institute Groningen (ESRIG), or the Centre for Advanced Radiation Technology (KVI-CART).

The student should consult the academic advisor and jointly decide on a suitable research group. Before doing so, the student must have completed at least 30 ECTS in the first year of the Master's programme. The student writes a thesis on the research conducted in the project and gives a final oral presentation on the subject matter.

When applying for graduation, a copy of the Master's thesis should be uploaded into the [repository](#) of the library. More information about the repository can be found on the [website](#).

First and second examiner

The Master's research project is assessed by the first examiner, generally this is also the supervisor and, as well as a second examiner. The second examiner is a faculty member from a group other than that in which the research is conducted. The names of both examiners will be mentioned in the Master's thesis.

Oral presentation of the Master's Thesis

It is advised to make an appointment (and announcement) for an oral presentation of the Master's thesis in time. Appointments should be made in concordance with the supervisor with the secretary of the research group.

General Physics Colloquium

All students in Physics and Applies Physics have to attend at least 10 colloquia in the series General Physics Colloquium. When attending a colloquium, the student should sign the attendance register. Announcements of these colloquia (on a green sheet of paper) are made on the publication board across from room 5111.0077, and on the [website](#).

The colloquium normally takes place Thursday afternoon at 4:00 p.m in lecture hall 5111.0080 of the Nijenborgh 4 building. During holidays no colloquia are organized.

For questions one can consult the chairman of the colloquium committee dr ir. C.J.G. Onderwater, who also keeps the attendance register in the Nestor course 'General Physics Colloquium'.

Dr.ir. C.J.G. Onderwater

Tel.: +31 (0) 50 – 363 3557

E-mail: c.j.g.onderwater@rug.nl

5.4 Applied Physics

Profile

A student in Applied Physics is interested in understanding and controlling physical phenomena of technical objects and processes. Practical applications are the primary motivation to research and analyze these processes. Students in Applied Physics are trained to think interdisciplinary and be able to integrate several fields of physics. Graduates of this programme have careers in industry (50 %) as well as in academia (30%).

Academic advisor

The academic advisor is drs. G.J.Zondervan. See section 3.4 for more information.

Internship and Research Project

The Master's research project can be carried out in the following research groups:

- Materials Science
- Micromechanics of materials
- Nanostructured Materials and Interfaces
- Photophysics and opto-electronics
- Device Physics of Complex Materials
- Physics of Nanodevices

or – upon approval of the Board of Examiners – in another research group in the field of physics.

Before doing so, the student must have completed at least 30 ECTS in the first year of the Master's programme. The student writes a thesis on the research conducted during the project and gives a final oral presentation on the subject matter. The thesis will also be assessed by the second examiner (see 5.3).

Because the thesis advisor in general also plans the internship, it is recommended to choose a research group in time. The period in which the student wishes to do the internship or other preferences regarding the internship, should be discussed with the thesis advisor.

For an overview of the research groups we refer to the [website](#).

When applying for graduation, a copy of the Master's thesis should be uploaded into the [repository](#) of the library. More information about the repository can be found on the [website](#).

General Physics Colloquium

All students in Physics and Applies Physics have to attend at least 10 colloquia in the series General Physics Colloquium. When attending a colloquium, the student should sign

the attendance register. Announcements of these colloquia (on a green sheet of paper) are made on the publication board across from room 5111.0077, and on the [website](#). The colloquium normally takes place Thursday afternoon at 4:00 p.m in lecture hall 5111.0080 of the Nijenborgh 4 building. During holidays no colloquia are organized. For questions one can consult the chairman of the colloquium committee dr.ir. C.J.G. Onderwater, who also keeps the attendance register in the Nestor course 'General Physics Colloquium'.

Dr.ir. C.J.G. Onderwater
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E-mail: c.j.g.onderwater@rug.nl

5.5 Specialization Science Business & Policy

The specialization Science, Business and Policy is a specialization of almost every Master's programme offered by the FWN. The aim of this specialization is to combine knowledge and insights from other disciplines, in particular management, organization and public administration.

The combination of Physics and Business and Policy is created for students interested in working for a (medium or big) science-oriented company.

The first year of the specialization is aimed at deepening the knowledge of physics and astronomy and doing a Research in this field/

The second and final year consists of the course 'Introduction Science, Business and Policy' and the combined internship/research 'Internship Business and Policy'. The course 'Introduction Science, Business and Policy' offers an introduction into the disciplines 'Management and Organization' and 'Public Administration'. You will apply the knowledge you have acquired in this course to multidisciplinary projects assigned by companies and the government.

The core of the combined internship/research project 'Internship Business and Policy' consists of an internship of six months with a company or institution. An internal internship at the university is also among the possibilities. The internship deepens the knowledge you acquired during the course 'Introduction Science, Business and Policy' and offers an in-depth introduction and practice with project management. The internship will be enriched with lectures, training sessions and exchange of experiences and briefings during two introductory weeks and an evaluation week.

The specialization Science, Business and Policy is conducted in Dutch, and is therefore not accessible to those who have no command of this language.

For more information on this specialization, please consult:

Drs. A.J. Abma (lecturer and coordinator)
Tel. +31 (0) 50 – 363 2263
E-mail: a.j.abma@rug.nl

5.6 Recommended optional courses

It is advised to choose at least part of the optional courses in close connection to the field of the thesis research project. For the various research groups the following courses are recommended. In case of doubt students should take advice from their research project supervisor.

Theoretical Subatomic Physics (High Energy Physics and Theoretical Nuclear Physics)

- Quantum Field Theory
- Elementary Particles
- Statistical Mechanics
- General Relativity
- Student Seminar on Quantum Universe

Computational Physics

- Computational Physics
- Solid Mechanics
- Non Linear Optics
- Computer Simulation of Quantum Systems
- Student Seminar on Quantum Computation

Theory of Condensed Matter

- Many Particle Systems
- Non Linear Optics
- Computational Physics
- Computer Simulation of Quantum Systems
- Theoretical Condensed Matter physics

Materials Science

- Mechanical Properties
- Micromechanics
- Capita Selecta Materials Science

Micromechanics

- Mechanical Properties
- Micromechanics
- Solid Mechanics
- Computational Physics

Physics of Nanodevices

- Device Physics
- Theoretical Condensed Matter Physics
- Many Particle Systems
- Mesosopic Physics

Solid State Optics

- Theoretical Condensed Matter Physics
- Many Particle Systems
- Non Linear Optics

Surfaces and Thin Layers

- Surfaces and Interfaces
- Theoretical Condensed Matter Physics
- Many Particle Systems

Non Linear Optics

Isotope Research (CIO)

Energy and Environment
Experimental Methods for Trace Gas Research
Environmental Physics

Theoretical Nuclear Physics

Nuclear Physics
Symmetry in Physics
Relativistic Quantum Mechanics
Quantum Field Theory
Elementary Particles
Particle Astrophysics
General Relativity
Student Seminar on Quantum Universe

Hadronic and Experimental Nuclear Physics, Accelerator Physics, Experimental Fundamental Physics

Nuclear Physics
Symmetry in Physics
Introductory Plasma Physics
Accelerator Physics and Ion Optics
Student Seminar on Quantum Universe
Radiation Physics
Nuclear Astrophysics

Atomic Physics

Atomic interactions
Key Experiments in Atomic Physics
Laser Cooling and Trapping
Student Seminar on Quantum Universe

6 Contact data

6.1 Department of Physics

Visiting Address Department of Physics

Physics and Chemistry Building,
Nijenborgh 4,
9747 AG Groningen
Reception: tel. +31 (0) 50 – 363 4133

Education Support Centre

email: esc.fwn@rug.nl,
room 5161.0143,
Ms. A.H.J. van der Born,
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room 5161.0143/5419.0178

Programme Coordinator

N. Bos, MSc
tel. +31 (0) 50 – 363 4873,
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Academic Advisor

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Physics Practicals and Lecture Demonstrations

Dr. R.J.H. Klein-Douwel,
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H. de Vries,
tel. +31 (0) 50 – 363 4858,
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Educational Design Physics (Didactics)

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IT Helpdesk

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web: www.rug.nl/cit/servicedesk,
room 5415.0052

Theoretical Physics

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Faculty (High Energy Physics): Prof.dr. E.A. Bergshoeff, Prof.dr. D. Boer, Prof.dr. E. Pallante, dr. K. Papadodimas, dr. D. Roest, Prof.dr. M. de Roo, Prof.dr. R.G.E. Timmermans

Faculty (Fundamental Interactions and Symmetries): dr. S. Hoekstra, Prof.dr. K.P. Jungmann, dr. C.J.G. Onderwater, dr. L. Willmann, Prof.dr. H.W.E.M. Wilschut

Computational Physics (ZIAM)

Secretary: Ms. A.M. Blanksma,
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Mrs. Drs I. de Roo-Kwant,
tel.: +31 (0) 50 – 363 4950,
e-mail: secr-vsi@rug.nl,
room 5111.0153,
Faculty: Prof.dr. H.A. De Raedt

Materials Science (ZIAM)

Secretary: Ms. E.C. Eekhof,
tel. +31 (0) 50 - 363 4898,
e-mail: e.c.eekhof@rug.nl,
room 5113.0038
Faculty: Prof.dr. J.T.M. de Hosson

Micromechanics (ZIAM)

Secretary: Ms. A.J. Sibma,
tel.: +31 (0) 50 – 3638047
e-mail: A.J.Sibma@rug.nl,
room 5113.0112,
Faculty: Prof.dr.ir. E. van der Giessen, Prof.dr.ir. P.R. Onck

Nanostructured Materials and Interfaces (ZIAM)

Secretary: Ms. A.W.G. McEwan-Bos,
tel.: +31 (0) 50 – 363 4974,
email: solidstate@rug.nl,
room 5113.0220
Prof.dr.ir. B.J. Kooij, dr. G. Palasantzas

Optical Physics of Condensed Matter (ZIAM)

Secretary: Ms. E.C. Eekhof,
tel.: +31 (0) 50 – 363 4974,
email: secretariaat.smb@rug.nl,
room 5115.0005,
Faculty: Prof.dr.ir. P.H.M. van Loosdrecht, dr. M.S. Pschenitchnikov, Prof.dr. T.T.M. Palstra (interim group leader), dr. R.I. Tobey

Photophysics and Optoelectronics (ZIAM)

Secretary: Ms. R.A.Hekkema-Nieborg,
tel.: +31(0) 50 – 363 8750,
e-mail: r.a.hekkema-nieborg@rug.nl,
room 5118.0113
Faculty: Prof.dr. M.A. Loi, dr. L.J.A. Koster

Physics of Nanodevices (ZIAM)

Secretary: Ms. A.W.G. McEwan-Bos,
tel.: +31 (0) 50 – 363 4974,
email: solidstate@rug.nl,
room 5113.0220
Faculty: dr. T. Banerjee, Prof.dr.ir. B.J. van Wees, Prof.dr.ir. C.H. van der Wal

Physics of Organic Semiconductors (ZIAM)

Secretary: Ms. E.C. Eekhof,
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room 5113.0038
Faculty: Prof. Dr.Ir. P.W.M. Blom, Prof. dr. D.M. de Leeuw, Prof.dr. T.T.M. Palstra

Single-Molecule Biophysics (ZIAM)

Secretary: Ms. J.K. de Boer,
Tel: +31 (0) 50 – 363
e-mail: secretariaat.smb@rug.nl,
room 5117.0010
Faculty: Prof.dr. A.M. van Oijen, Prof.dr. W. Roos, Dr. T.M. Cordes

Surfaces and Thin Films (ZIAM)

Secretary: Ms. Y.P.M. Nagelhout,
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room 5112.0058
Faculty: Prof.dr. P. Rudolf, dr. M.A. Stöhr

Theory of Condensed Matter (ZIAM)

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e-mail: secr-vsi@rug.nl,
room 5111.0153,
Faculty: dr. T.L.C. Jansen, Prof.dr. J. Knoester, Prof.dr. M.V. Mostovoy

Neuro-Biophysics (BCN)

Faculty: Prof. Dr. D.G. Stavenga
e-mail: D.G.Stavenga@rug.nl,

Isotope Research (ESRIG)

Secretary: J.A. Owczarczyk-van Oijen,
tel.: 050 – 363 4760
e-mail : j.a.van.oijen-owczarczyk@rug.nl,
room 5112.0030
Faculty: Prof.dr. H.A.J. Meijer, Prof.dr. M.A. Herber, Prof.dr.ir. J. van der Plicht, dr. W. Klaassen

KVI - Center for Advanced Radiation Technology (KVI-CART)

Zernikelaan 25
9747 AA Groningen
Reception: +31 (0) 50 – 363 3600,
e-mail: kvi-cart-facilitydesk@rug.nl,

Head: prof.dr. A.M. van den Berg

Faculty:

- Quantum Interactions and Structural Dynamics
Prof.dr.ir R.A. Hoekstra , dr. T.A. Schlathölter,
- Accelerator and Radiation Physics
Prof.dr. S. Brandenburg, dr.ir. J.P.M. Beijers, dr. M.J. van Goethem, dr. E. R. van der Graaf, dr. M.H. Mofstee, dr. V. Mironov, dr. R.W. Ostendorf
- Hadronic and Nuclear Physics
dr. P.G. Dendooven, Prof.dr. M.N. Harakeh, Prof.dr. N. Kalantar-Nayestanaki, ,
Prof.dr. H. Löhner, dr. M. Kavatsyuk, dr. J.G. Messchendorp, dr. C. Rigollet,
- Astro-Particle Physics
Prof. Dr. A.M. van den Berg, Prof. Dr. O. Scholten,
- Medical Physics
Dr. A.K. Biegun

6.2 List of faculty members and supporting staff

	Telephone (+31 50 363.....)	E-mail (...@rug.nl)	Room
Adj. Director			
Onck, Prof.dr.ir. P.R.	8039	p.r.onck	5113.0114
Academic advisor			
Zondervan, Drs. G.J.	4130	g.j.zondervan	5614.0049
Programme coordinator			
Bos, MSc, N.	4873	ESCphysics	5161.0306
EducationSupport Center			
van der Born, Ms. A.H.J.	9775	esc.fwn	5161.0143
Practicals			
Klein-Douwel, dr. R.J.H. (coordinator)	4931	r.j.h.klein-douwel	5113.0314
Vries, dhr. H. de	4858	hans.de.vries	5113.0311
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