



University of Nova Gorica

School of Science



School of Science

From Atoms to Galaxies

Are you interested in revealing the mysteries of the universe? Which physical laws and principles govern the world around us, from the forces between basic units of matter to the greatest structures in the universe? What is the origin of the universe, its evolution and its future? What are the properties and applications of advanced materials that enter our daily lives?

You can find out more about these exciting topics by enrolling into academic programs of the School of Science at the University of Nova Gorica, which cover physical phenomena in nature on all size scales.

University of Nova Gorica is an international research oriented university, ranked first in Slovenia according to the international Round University Ranking (RUR). Despite its short tradition (celebrating its 25th anniversary in 2020) and a relatively small size, the University of Nova Gorica excels on an international scale, as recognized by the U-Multirank since 2015.

Excellence and Individual Approach

The School of Science is a hub of enthusiastic students, researchers, assistants and professors from Slovenia and all around the world. United by common passions, that range from atoms, molecules, materials, devices, to the understanding of our atmosphere, the stars, galaxies and the Universe as a whole. The School of Science offers research-oriented BSc, MSc degrees, supported by our labs and research centers. Furthermore, students have the unique possibility to remotely perform astronomical observations with the GoChile telescope located under the dark sky of Chile. At the UNG Graduate School, there is the possibility to continue to PhD degree in Astrophysics, Physics or Materials Science.

Accreditation

We offer bachelor and master programs in **physics and astrophysics**, as well as master program in **materials science**. All our programs are accredited by the Slovenian Quality Assurance Agency for Higher Education.

Funding

Bachelor program on physics and astrophysics is financially supported by the government of the Republic of Slovenia. The support covers the tuition for citizens of Slovenia and other EU countries, as well as for the citizens of Serbia, Bosnia-Herzegovina, Monte Negro and Macedonia. Master programs are not financially sup-

ported and are subject to tuition fees. Information on possible individual study grants for talented students are available from the school office.

Career Possibilities

Although general orientation of the **bachelor program** is inclined towards astrophysics and solid state physics, it nevertheless provides a broad enough base of knowledge for the graduates to be able to pursue further studies or employment in any field of physics.

Graduates that decide to stay in academia may pursue master level studies at the UNG School of Science. A number of our graduates also successfully pursued academic careers at other universities, as well as in business sector, government bodies and agencies.



Academic Programs

Bachelor program “Physics and Astrophysics”

The aim of the bachelor program “**Physics and astrophysics**” is to provide general theoretical and experimental knowledge in a broad spectrum of physics fields, required for research work, and to gradually involve the students in actual research in senior years.

Lectures are given in small groups, exploiting the possibility of **international exchange** through the ERASMUS+ and other programs. Students have the possibility to transfer ECTS credit points between same level programs at the University of Nova Gorica and other universities accredited in the EU.

In their first year students take elementary courses in mathematics and physics as well as a course on experimental methods, which is needed for student laboratories. In the second and third year, the courses increasingly focus on specific core study areas, and are complemented by research work. These lectures are as a rule implemented in concentrated, two months courses.

As seniors, students have the opportunity to become involved in actual research in state-of-the-art research laboratories and centers of the UNG. They conclude their studies with a diploma seminar.

Based on the acquired competences and skills graduates can pursue academic careers in master level programs (in either physics and astrophysics or materials science) either at the University of Nova Gorica or at other universities.

Admission Requirements

Successfully completed upper secondary education (level 3) according to International Standard Classification of Education (ICSED 2011) which allows direct access to tertiary education. In the case of major differences between the educational system of the applicant's country and the EU the school will consider the applications individually.

Please note that courses are available in English language.

Duration: 3 years

Maximum number of students: 30

A total of 180 ECTS credits is required for graduation, which can be obtained as:

- Mandatory courses (138 ECTS)
- Elective courses (36 ECTS)
- Diploma seminar (6 ECTS).

Upon graduation students will be awarded academic title **Bachelor of Physics**.



More information can be found at:

<http://www.ung.si/en/study/school-of-science/study/>



Academic Programs

Master program “Physics and Astrophysics”

The aim of master program “Physics and astrophysics” is to provide detailed knowledge in the fields of a) **astrophysics** or b) **solid state physics**, which are selectable as modules.

An essential aspect of the studies are research activities in the supporting research laboratories and centers of the University of Nova Gorica (Center for Astrophysics and Cosmology, Center for Atmospheric Research, Laboratory of Organic Matter Physics, Materials Research Laboratory and Laboratory for Quantum Optics).

Research in state-of-the-art laboratories and centers forms the basis for student’s master theses, which are often related to research within international collaborations and observatories, such as Pierre Auger, Cherenkov Telescope Array, Elettra light source, and published in international scientific journals. We believe that working experience in international environment and with state-of-the-art technologies increases the competitiveness of our graduates in their further careers.

Admission Requirements

Successfully completed bachelor or equivalent level (level 6) according to International Standard Classification of Education (ICSED 2011) from a corresponding field of science (physics, astrophysics, astronomy, materials science). In the case of major differences between the educational system of the applicant’s country and the EU the school will consider the applications individually.

Duration: 2 years

Maximum number of students: 30

A total of 120 ECTS credits is required for graduation, which can be obtained as:

- Mandatory courses (30 ECTS)
- Elective courses (72 ECTS)
- Master thesis (18 ECTS)

Upon graduation students will be awarded academic title **Master of Physics**.



Master program “Materials Science”

Master program “Materials Science” is based on research excellence of the University of Nova Gorica in the fields of physics and chemistry of materials, materials characterization, as well as materials technologies and development of innovative products and services, including the protection of intellectual property.

The emphasis of the program is on acquiring practical skills in the synthesis of advanced materials and their characterization (hands-on training). More than a half of student activities within compulsory courses are reserved for laboratory work and seminar exercises, and a range of elective courses will be provided to allow in-depth studies in selected fields of materials science.

Small number of students (limited to 20) will allow them to obtain specific hands-on experience on the most advanced instruments for materials characterization available for research. In all courses a strong emphasis will be given to skills such as communication, self-confidence, awareness and team-work abilities. Students will be able to gain practical knowledge and skills in synthesis and characterization of the state-of-the-art materials and will also actively participate in actual ongoing research projects at research laboratories of the University of Nova Gorica and its partner institutions, the National Institute of Chemistry and the Jožef Stefan Institute.

Admission Requirements

Successfully completed bachelor or equivalent level (level 6) according to International Standard Classification of Education (ICSED 2011) for graduates majoring in science and engineering, majoring in physics, chemistry, chemical engineering and materials engineering. In the case of major differences between the educational system of the applicant's country and the EU the school will consider the applications individually.

The program is recommended to students who wish to pursue academic or professional careers in materials science, and are interested in new materials for electronic, magnetic, optical and other advanced applications.

Foreign students are welcome, courses and other academic activities will be conducted in English.

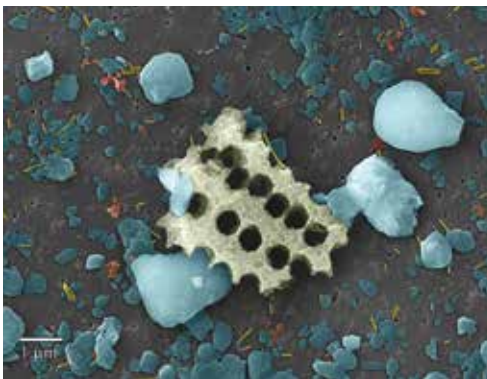
Duration: 2 years

Maximum number of students: 20

A total of 120 ECTS credits is required for graduation, which can be obtained as:

- Mandatory courses (84 ECTS)
- Elective courses (18 ECTS)
- Master thesis (18 ECTS)

Upon graduation students will be awarded academic title **Master of Materials Science**.



Research

Scientific and research work

Student research activities at the School of Science are conducted at:

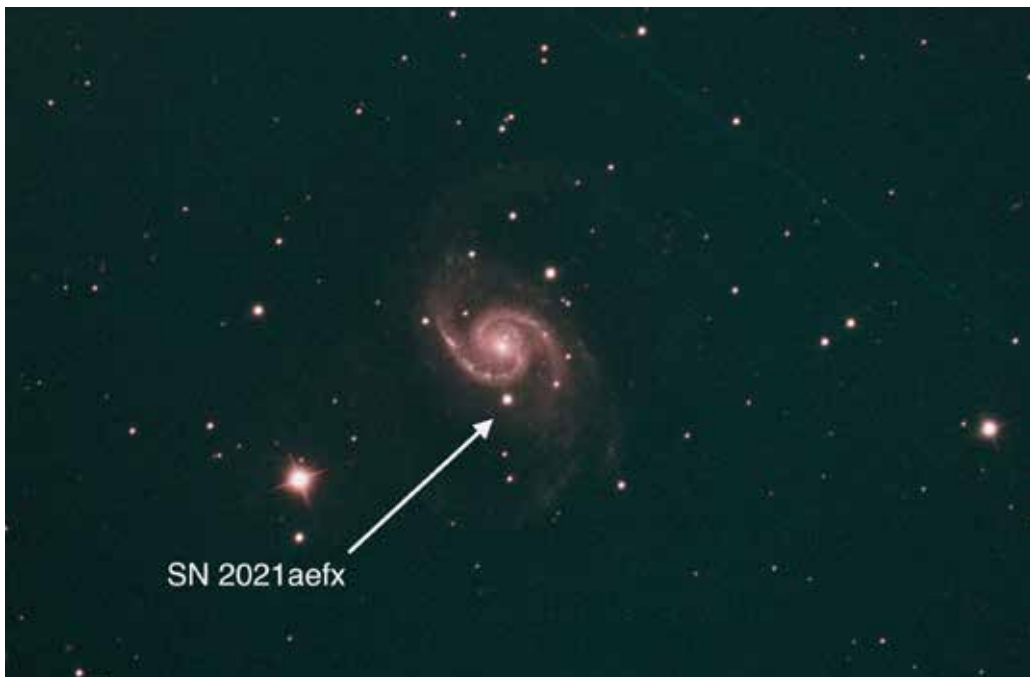
- Centers and laboratories of the University of Nova Gorica, Ajdovščina
 - Center for Astrophysics and Cosmology
 - Center for Atmospheric Research
 - Laboratory for Organic Matter Physics
 - Materials Research Laboratory
 - Laboratory for Quantum Optics
- Laboratories and centers of the National Institute of Chemistry, Ljubljana
- Laboratories and centers of the Jožef Stefan Institute, Ljubljana

Astrophysics

Research in astrophysics covers phenomena in the extreme fields of science, on the scales of both quarks and the universe, and contributes to the understanding of nature at the most fundamental level. At the Center for Astrophysics and Cosmology we explore the processes at the **highest energies in the universe**, for example transient events such as gamma ray bursts, tidal disruption events and supernovae, which can be detected both with optical telescopes as well as ultra-high energy cosmic rays and gamma rays. This research is pursued through partnership in large international scientific collaborations, such as observatories Pierre Auger, Cherenkov Telescope Array and Vera C. Rubin, Fermi-LAT, Swift, robotic Liverpool Telescope, Gaia and Belle2.



<https://www.gochile.si/>



Supernova observed with a GoChile telescope, which is available to our students.

Research

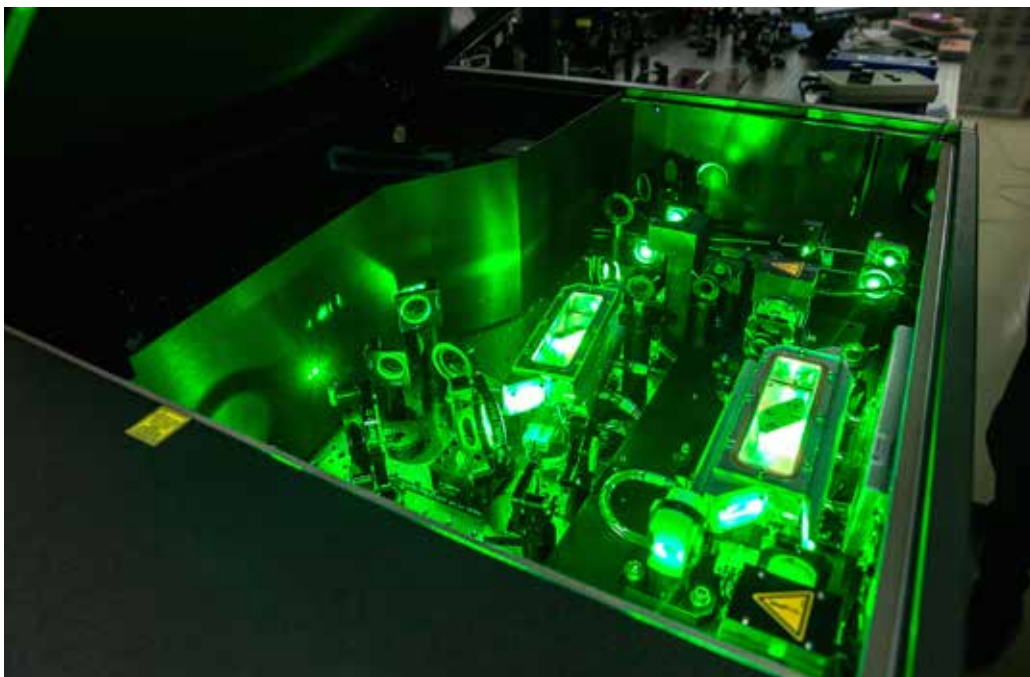
Solid State Physics

Research in solid state physics covers the characterization and study of phenomena on the entire energy spectrum and scale in nature, from atoms, molecules and atom clusters to crystals and polycrystalline nano-structured materials. It is primarily conducted within Laboratories for Quantum Optics, Organic Matter Physics and Materials Research at the University of Nova Gorica, based on the use of in-the-house state-of-the-art research equipment. Key topics in solid state physics include studies of transport properties of organic thin layers, morphological and electrical properties of surfaces on molecular scale, and properties of substances on atomic level. The last topic is being studied using the CITIUS femtosecond light source at UNG and the Elettra light source in Trieste.

Materials Science

Research in materials science covers a wide range of experimental and theoretical studies in the synthesis, properties, structure and performance of different ma-

terial types, including biomaterials, carbon and polymeric materials and their functionalities (such as catalysts, batteries, (semi)conductors and magnetic materials). Research is primarily conducted in Laboratory for materials research at the University of Nova Gorica, in Materials synthesis department at the Jožef Stefan Institute in Ljubljana and in the departments of Inorganic Chemistry and Technology, Materials Chemistry, Biomolecular Structure and Slovenian NMR Centre at the National Institute of Chemistry in Ljubljana. Research activities are based on the use of state-of-the-art research facilities, including transmission electron microscope with the atomic resolution (AR STEM), different liquid and solid-state NMR spectrometers and high-resolution X-ray diffractometers, as well as on numerous international co-operations of involved researchers. The main areas of research that are globally renowned in scientific and research community are materials for energy and environmental applications.





If you want to learn more about the School of Science and the programs we offer, please visit our virtual home.



<http://www.ung.si/en/study/school-of-science/>

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