



UNIVERSITÀ DEGLI STUDI
DELL'INSUBRIA

OPEN DAY 2021



Master's Degree in Physics



UNIVERSITÀ DEGLI STUDI
DELL'INSUBRIA

Como, 17th. May 2021

Master's Degree

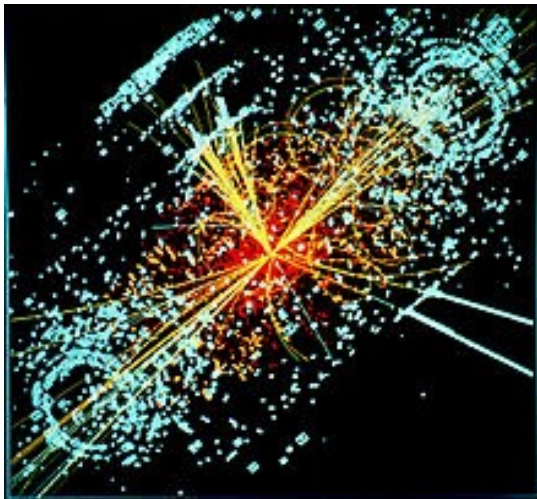
WHY PHYSICS?

The Master's Degree Programme in Physics (LM-17 Class)

affords students the opportunity to acquire advanced competences in modern physics, in both fundamental and applied fields.

SUBJECTS

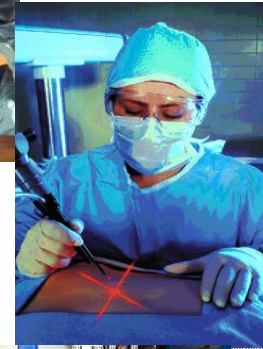
*The Master's Course in Physics aims at **completing the elements acquired during the Bachelor's course** in the various areas and to bring students into contact **with the different research fields**.*



*A Master's Degree in Physics can lead to **employment in research laboratories** at research centres or in high-tech companies, to **entrance into finance** or **insurance companies**, or to a **career as a teacher in high school**.*

Career opportunities

- **Research activity in the R&D sectors of high-tech companies** (such as those in the fields of electronics, telecommunication, medical instrumentation and optics)
- **Research activity for the development of statistical models** and for big-data analysis in banks, finance or insurance companies
- **Teaching activity in high schools** (which requires undergoing a selection procedure laid out by the Ministry of Education)
- Continuation of the studies with a **PhD or a Specialization School**, such as that in Medical Physics.



Master's Degree

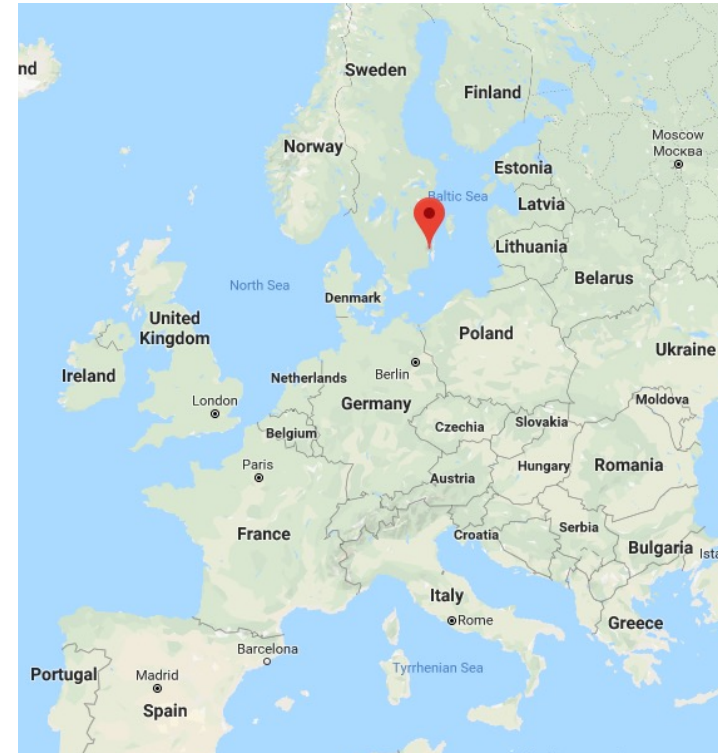
In general, a Master's Degree is influenced by the specific research activities present in the University

- Open to all students with a Bachelor's Degree in Physics (L-30 Class)
- Knowledge of English at the B2 level
- All the Master's Degree courses are held in English
- Erasmus Program
- Double Degree Program: Agreement with Linnaeus University (Kalmar, Sweden)



Double degree

- Students must spend a semester at Linnaeus University (Kalmar, Sweden)
- 30 credits
- Master's thesis discussion in the presence of faculty members from Linnaeus University
- Erasmus funding + additional University funding



And in Como...

There is student accommodation at **“La Presentazione”** within walking distance from via Valleggio 11, where the Physics courses are held.

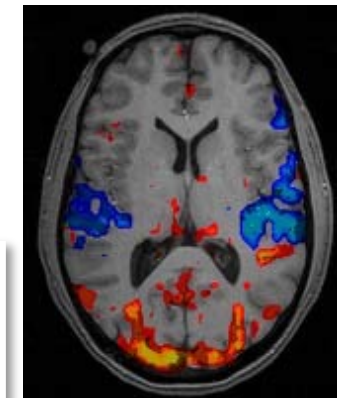
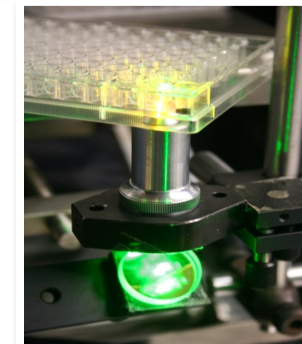
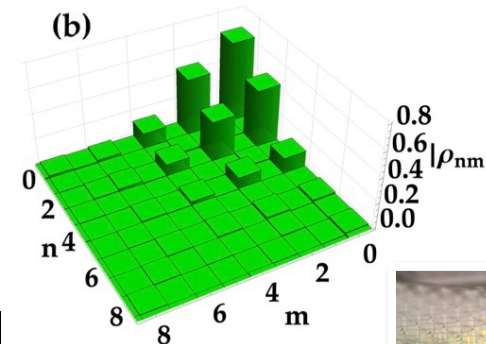
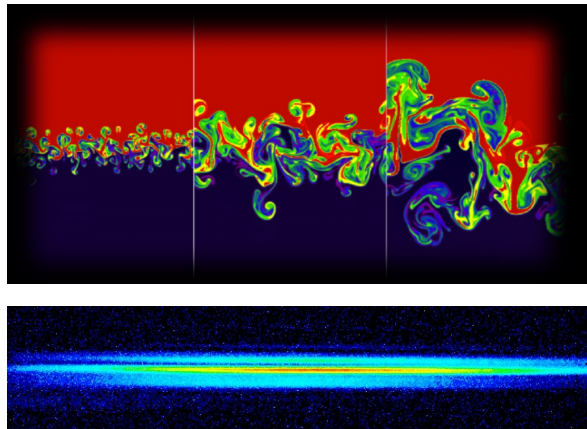


Credits and curricula

To obtain a Master's Degree in Physics, students must acquire **120 credits** over two years, choosing from among

3 available curricula:

- General Physics
- Data Science for Astrophysics
- Medical and Experimental Physics



Credits and curricula

To obtain a Master's Degree in Physics, students must acquire **120 credits** over **two years** as follows:

- 42 credits in the following areas:
 - *Experimental and Applied Physics*
 - *Theoretical and Fundamental Physics*
 - *Microphysics*
 - *Astrophysics*
- 12 credits among affine and integrative activities
- 12 credits chosen freely
- 6 credits performing a supervised Traineeship
- 48 credits based on the Final Thesis

Credits and curricula

- 42 credits in the following areas:

1) *Experimental and Applied Physics*

- Scripting and programming laboratory for data analysis
- Optics with laboratory
- Non-linear optics
- Environmental physics
- Basis of medical physics
- Physical basis of diagnostic imaging
- Elements of dosimetry
- Physical basis of radiotherapy
- Medical physics laboratory
- Advanced experimental and data analysis techniques
in particle and nuclear physics

2) *Theoretical and Fundamental Physics*

3) *Microphysics*

4) *Astrophysics*

Credits and curricula

- 42 credits in the following areas:

1) *Experimental and Applied Physics*

2) *Theoretical and Fundamental Physics*

- Quantum physics III
- Quantum information theory
- Statistical physics I
- Statistical physics II
- Theoretical physics
- Geometrical methods in physics
- General relativity
- Physics of dynamical systems
- Physics of complex systems

3) *Microphysics*

4) *Astrophysics*

Credits and curricula

- 42 credits in the following areas:

1) *Experimental and Applied Physics*

2) *Theoretical and Fundamental Physics*

3) *Microphysics*

- *Radiation and detectors*
- *Laser physics*
- *Metamaterials*
- *Quantum and semiclassical optics*
- *Elementary particle phenomenology*
- *Solid state physics*
- *Many-body physics*
- *Collective properties of condensed matter systems*

4) *Astrophysics*

Credits and curricula

- 42 credits in the following areas:

1) *Experimental and Applied Physics*

2) *Theoretical and Fundamental Physics*

3) *Microphysics*

4) *Astrophysics*

- *Elements of astrophysics and cosmology*
- *Computational astrophysics*
- *Time-domain astrophysics*
- *Artificial intelligence for astrophysical problems*

Affine and integrative activities

Two exams are to be chosen among the following affine and integrative activities

- *Detection and characterization of optical states*
- *Optical signal analysis*
- *Applied electronics*
- *Aspects of chemical, biological, radiological and nuclear security*
- *Laboratory of biophysics and photopharmacology*
- *Intelligent systems*
- *Models for biological systems*
- *Analytical and probabilistic methods in mathematical physics (A)*
- *Numerical solution of PDE (A)*
- *Computational chemical physics*
- *Nanomaterials*

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PHYSICS

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INFORMATICS

Affine and integrative activities

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MATHS

Affine and integrative activities

Two exams are to be chosen among the following affine and integrative activities

- *Detection and characterization of optical states*
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CHEMISTRY

Traineeship

- The traineeship is **compulsory**
- It may be **performed in the university laboratories**, at research centres and **in high-tech companies**
- It should be **different from the thesis work**

Master's Degree Final Thesis

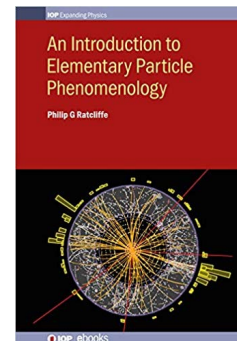
- The thesis is required to be **original work** in an area of theoretical, experimental or applied physics.
- The student is **followed by a supervisor** and should address a topic of real interest to the scientific community, **using advanced computation, experimental and/or theoretical techniques.**

Research areas

Elementary particle physics experimental / theoretical

- Photodetectors and their applications
- Strong interaction physics

National and international collaborations





Research areas

Medical physics experimental

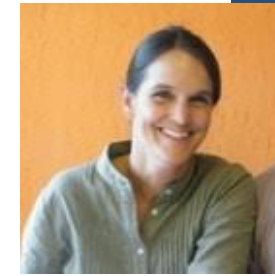
- Use of particle beams for diagnosis and therapy
- Development of innovative detectors for ionizing radiation
- Use of nanoparticles for drug delivery



Research areas

Optics

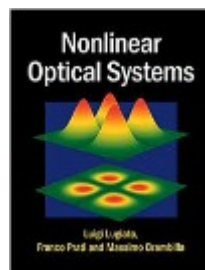
experimental / theoretical



- Laser physics and spatio-temporal structures
- Ultrafast non-linear optics and micro-fabrication
- Light diffusion by nanoparticles
- Quantum optics and quantum information



National and international collaborations



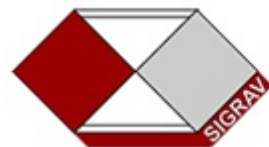
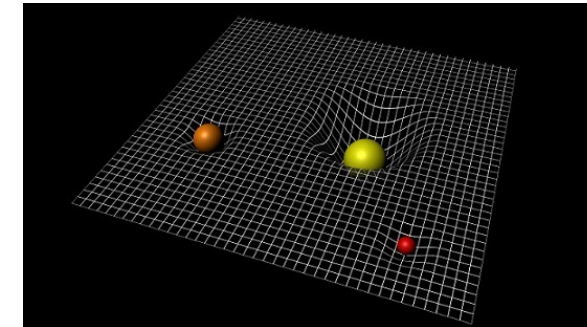
Research areas

Gravitational physics



- The origin of dark energy
- Large scale structure of the Universe
- Curved-space quantization
- Analog gravity

National and international collaborations



SIGRAV

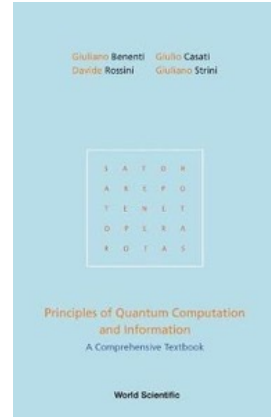


Research areas

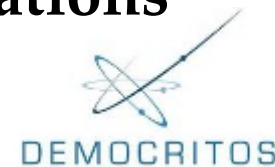
Physics of matter experimental / theoretical



- Magnetism and superconductivity
- Quantum information
- Soft matter
- Quantum transport
- Statistical physics
- Non-linear dynamics and complex systems

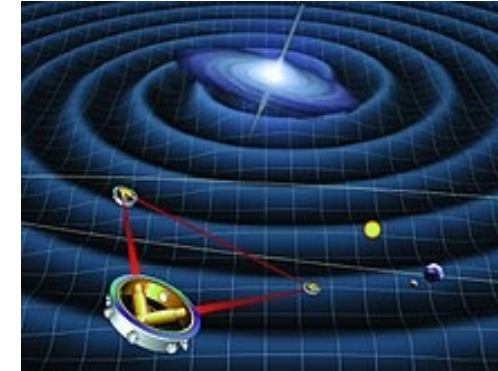
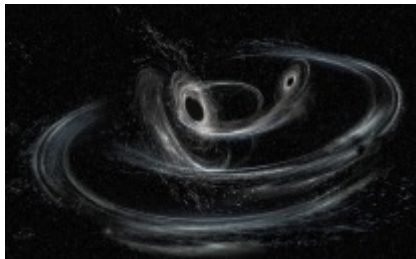
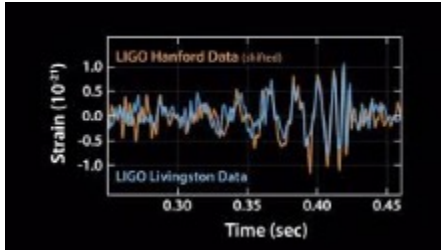


National and international collaborations



Research areas

Data Science for Astrophysics In collaboration with INAF/OAB



- Extragalactic astrophysics
- Physical Cosmology
- Numerical astrophysics
- Time-variable phenomena
- Big Data in Astrophysics
- Exoplanets



Thank you for your attention!



For further information and questions please contact
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