UNIVERSITÀ DEGLI STUDI
DELL'INSUBRIA

OPEN DAY 2020

Master's Degree in Physics

UNIVERSITÀ DEGLI STUDI
DELL'INSUBRIA

Como,12th. June 2020

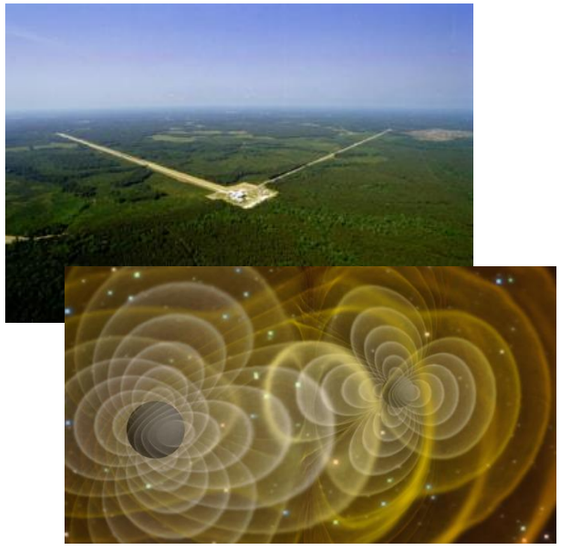
Master's Degree

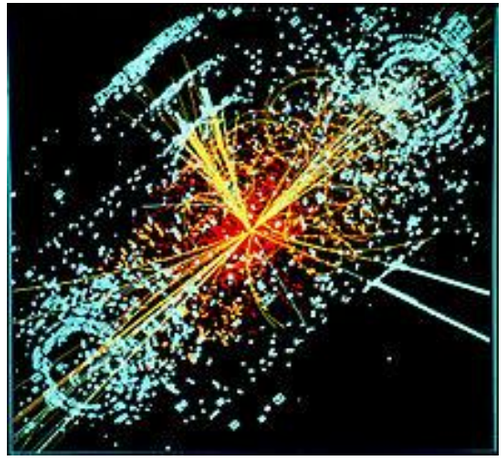
WHY PHYSICS?

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****.*

Master's Degree

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

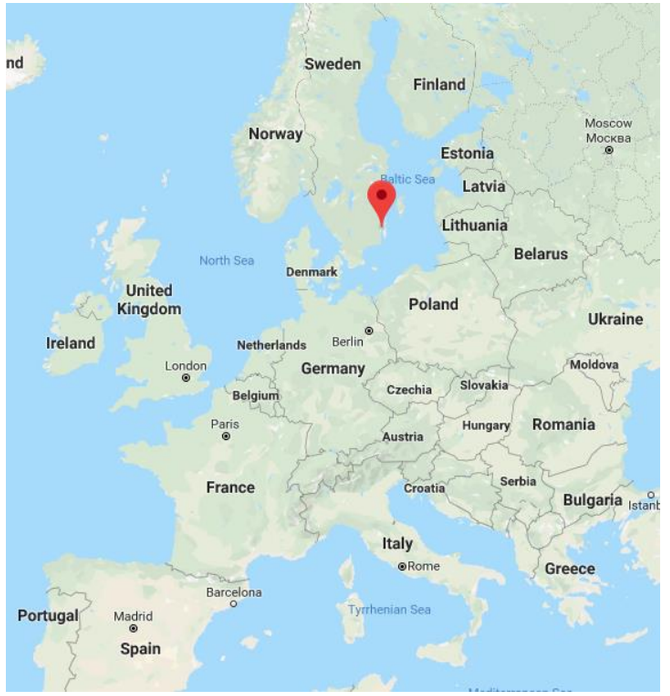
- **Open to all students with a Bachelor's Degree in Physics (L-30 Class)**
- **Knowledge of English at the B2 level**

- **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

Linnæus University



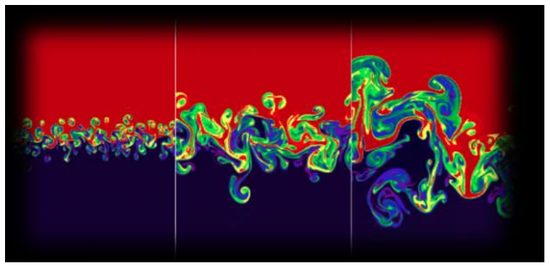
And in Como…

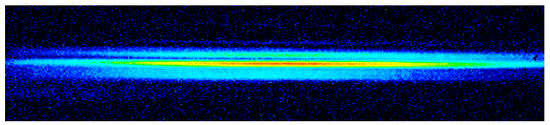
There is student accommodation at **"La Presentazione"** within walking distance from via Valleggio 11, where the Physics courses are held.

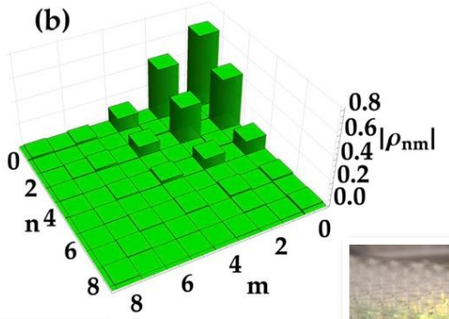
Credits and curricula

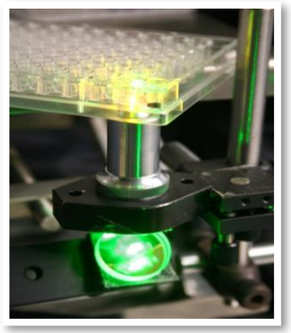
To obtain a Master's Degree in Physics, students must acquire 120 credits over two years, choosing from among
3 available curricula:

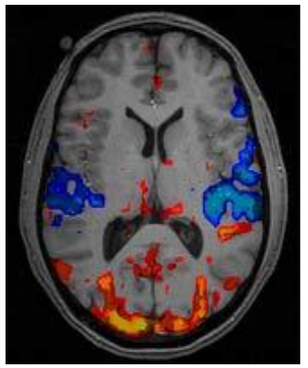
- **General Physics**
- **Data Science for Astrophysics**
- **Medical and Experimental Physics**











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*

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*
- *Intelligent systems*
- *Data mining*
- *Models for biological systems*
- *Analytical and probabilistic methods in mathematical physics (A)*
- *Numerical solution of PDE (A)*
- *Computational chemical physics*
- *Nanomaterials*

Affine and integrative activities

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

PHYSICS

- *Detection and characterization of optical states*
- *Optical signal analysis*
- *Applied electronics*
- *Aspects of chemical, biological, radiological and nuclear security*
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INFORMATICS

Affine and integrative activities

Two exams are to be chosen among the following 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

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- *Aspects of chemical, biological, radiological and nuclear security*
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- *Nanomaterials*

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

CERN

UNIVERSITÉ PARIS SUD
université PARIS-SACLAY

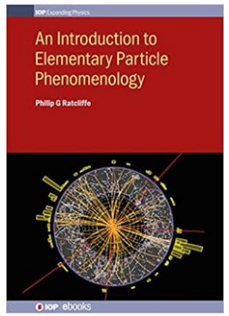
UNIVERSITÀ DEGLI STUDI DI MILANO BICOCCA

INFN
Laboratori Nazionali del Gran Sasso

CAEN
Tools for Discovery

ATTRACT

e+nubet

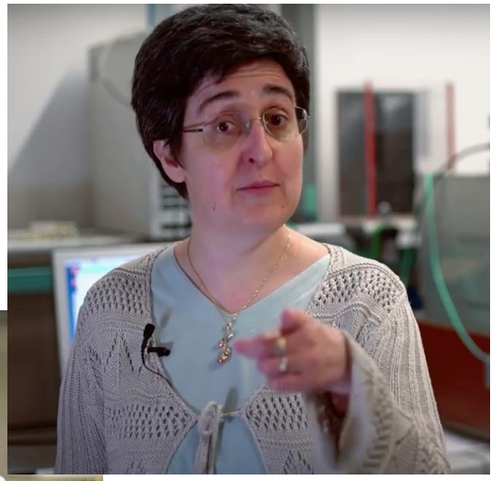



Research areas

Medical physics

experimental

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

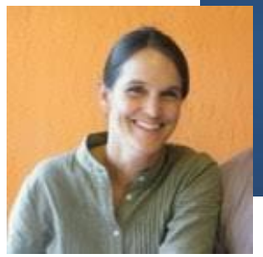
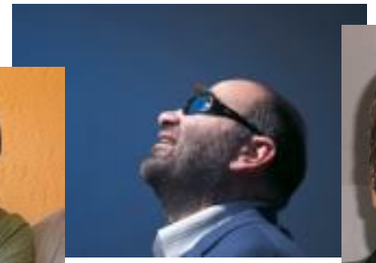


Research areas

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

Nonlinear Optical Systems

Luigi Lugiato, Franco Prati and Massimo Brambilla

coeLux

Experience the Sky

CNR IFN

Istituto di Fotonica e Nanotecnologie

UNIVERSITÉ CÔTE D'AZUR

University of Glasgow

STVDIORVM MEDIOLANENSIS VNIVERSITAS

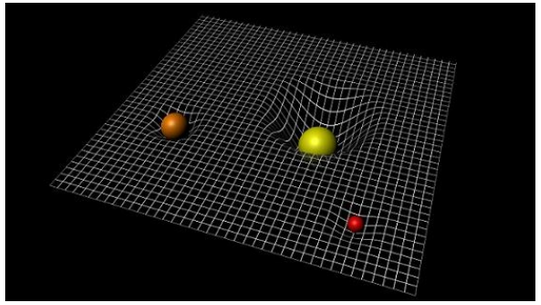
UNIVERZITA PALACKÉHO V OLOMOUCI

ÉCOLE POLYTECHNIQUE

Research areas

Gravitational physics

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



National and international collaborations

IHÉS Institut des Hautes Études Scientifiques

PI PERIMETER INSTITUTE FOR THEORETICAL PHYSICS

SIGRAV

University of Glasgow

UNIVERSITÉ PARIS SUD

université PARIS-SACLAY

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

SISSA — ma per seguir virtute e canoscenza

INTERNATIONAL INSTITUTE OF PHYSICS — Federal University of Rio Grande do Norte

LABORATOIRE CHARLES COULOMB MONTPELLIER

DEMOCRITOS

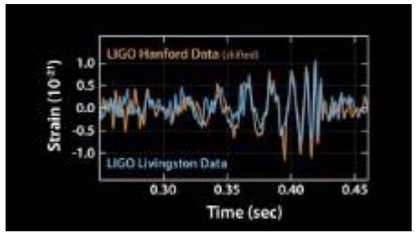
POLITECNICO MILANO

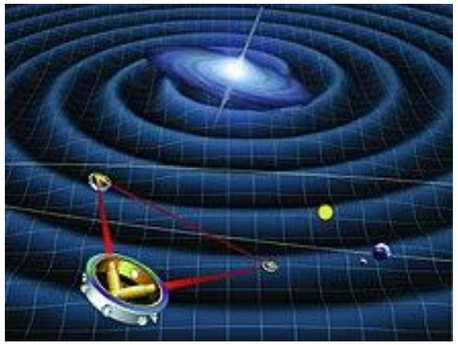
TSINGHUA UNIVERSITY 1911

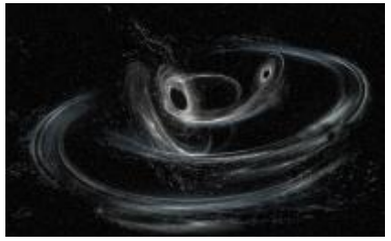
Research areas

Data Science for Astrophysics

In collaboration with INAF/OAB







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

Osservatorio Astronomico di Brera INAF

ma per seguir virtute e canoscenza SISSA

UNIVERSITY OF CALIFORNIA SANTA CRUZ

UNIVERSITA' DEGLI STUDI DI MILANO BICOCCA

School of Physics and Astronomy

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.






Thank you for your attention!

For further information and questions please contact

Prof. Michela Prest - e-mail:michela.prest@uninsubria.it