

## FISICA E ASTRONOMIA

PE2\_1 Fundamental interactions and fields

PE2\_2 Particle physics

PE2\_3 Nuclear physics

PE2\_4 Nuclear astrophysics

PE2\_5 Gas and plasma physics

PE2\_6 Electromagnetism

PE2\_7 Atomic, molecular physics

PE2\_8 Ultra-cold atoms and molecules

PE2\_9 Optics, non-linear optics and nano-optics

PE2\_10 Quantum optics and quantum information

PE2\_11 Lasers, ultra-short lasers and laser physics

PE2\_12 Relativity

PE2\_13 Thermodynamics

PE2\_14 Non-linear physics

PE2\_15 Metrology and measurement

PE2\_16 Statistical physics (gases)

PE3\_1 Structure of solids, material growth and characterisation

PE3\_2 Mechanical and acoustical properties of condensed matter, Lattice dynamics

PE3\_3 Transport properties of condensed matter

PE3\_4 Electronic properties of materials, surfaces, interfaces, nanostructures, etc.

PE3\_5 Physical properties of semiconductors and insulators

PE3\_6 Macroscopic quantum phenomena: superconductivity, superfluidity, etc.

PE3\_7 Spintronics

PE3\_8 Magnetism and strongly correlated systems

PE3\_9 Condensed matter – beam interactions (photons, electrons, etc.)

PE3\_10 Nanophysics: nanoelectronics, nanophotonics, nanomagnetism, nanoelectromechanics, etc.

PE3\_11 Mesoscopic physics

PE3\_12 Molecular electronics

PE3\_13 Structure and dynamics of disordered systems: soft matter (gels, colloids, liquid crystals, etc.), liquids, glasses, defects, etc.

PE3\_14 Fluid dynamics (physics)

PE3\_15 Statistical physics: phase transitions, noise and fluctuations, models of complex systems, etc.

PE3\_16 Physics of biological systems

## FISICA E ASTRONOMIA

PE9\_1 Solar and interplanetary physics

PE9\_2 Planetary systems sciences

PE9\_3 Interstellar medium

PE9\_4 Formation of stars and planets

PE9\_5 Astrobiology

PE9\_6 Stars and stellar systems

PE9\_7 The Galaxy

PE9\_8 Formation and evolution of galaxies

PE9\_9 Clusters of galaxies and large scale structures

PE9\_10 High energy and particles astronomy – X-rays, cosmic rays, gamma rays, neutrinos

PE9\_11 Relativistic astrophysics

PE9\_12 Dark matter, dark energy

PE9\_13 Gravitational astronomy

PE9\_14 Cosmology

PE9\_15 Space Sciences

PE9\_16 Very large data bases: archiving, handling and analysis

PE9\_17 Instrumentation - telescopes, detectors and techniques

PE4\_3 Molecular architecture and Structure

PE4\_4 Surface science and nanostructures

PE5\_3 Surface modification

PE5\_4 Thin films

PE5\_10 Colloid chemistry

PE6\_2 Distributed systems, parallel computing, sensor networks, cyber-physical systems

PE6\_7 Artificial intelligence, intelligent systems, natural language processing

PE6\_8 Computer graphics, computer vision, multimedia, computer games

PE6\_9 Human computer interaction and interface, visualisation

PE6\_11 Machine learning, statistical data processing and applications using signal processing (e.g. speech, image, video)

PE6\_12 Scientific computing, simulation and modelling tools

PE6\_13 Bioinformatics, bio-inspired computing, and natural computing

PE6\_14 Quantum computing (formal methods, algorithms and other computer science aspects)

PE7\_4 (Micro- and nano-) systems engineering

PE7\_5 (Micro- and nano-) electronic, optoelectronic and photonic components

<b>FISICA E ASTRONOMIA</b>
PE7_7 Signal processing
PE7_8 Networks, e.g. communication networks and nodes, Internet of Things, sensor networks, networks of robots
LS1_7 Molecular biophysics, biomechanics, bioenergetics
LS1_14 Innovative methods and modelling in molecular, structural and synthetic biology
LS7_1 Medical imaging for prevention, diagnosis and monitoring of diseases
LS7_14 Digital medicine, e-medicine, medical applications of artificial intelligence
SH7_6 Environmental and climate change, societal impact and policy
SH7_9 Energy, transportation and mobility