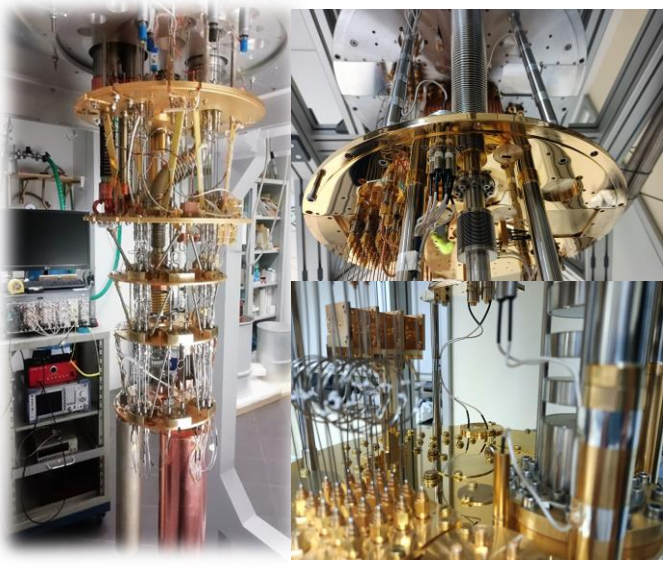
OBIETTIVI FORMATIVI

Scope of the program

The revolution promised by quantum technologies requires a wide scientific community with multidisciplinary skills.

Its training will have to ensure the functioning of the entire supply chain from basic research to the competitiveness of Italian high-tech companies, with an enhancement of people with key skills, startups capable of transferring and implementing new technologies and companies capable of integrating QT into systems and services.

The Master's Degree in Quantum Science and Engineering (QS&E) aims at preparing this new generation of quantum scientists and engineers. All classes will be held in English and experimental courses will take place in top-class labs available at UNINA and in international companies collaborating with UNINA and participating to the educational project.



Website

LMQSE: www.fisica.unina.it/corso-di-laurea-magistrale-in-quantum-science-engineering

Coordinator

Prof. Francesco Tafuri: francesco.tafuri@unina.it

Segreteria Studenti Area didattica di Scienze

Complesso universitario di Monte S. Angelo '- Via Cintia

Tel. 081676550' 081676544 - segrmmff@unina.it

Segreteria Didattica del Dipartimento di Fisica

Complesso universitario di Monte S. Angelo – Via Cintia

Dipartimento di Fisica "Ettore Pancini"

Tel. 081676874 - segrdid@na.infn.it

Seat: Dipartimento di Fisica "Ettore Pancini", Complesso Universitario di Monte Sant'Angelo, Via Cinthia, 21, Edificio 6. 80126 Napoli

www.google.it/maps/place/Universit%C3%A0+Federico+II+-+Dipartimento+Scienze+Fisiche/@40.8383322,14.1813514,17z/data=!3m1!4b1!4m5!3m4!1s0x133b0ed70f3e3543:0x2fc6f6dc20c950d3!8m2!3d40.8383322!4d14.1835401

Degree Progam website: https://www.fisica.unina.it/corso-di-laurea-magistrale-in-quantum-science-and-engineering

Department website: http://www.fisica.unina.it

School website: http://www.scuolapsb.unina.it/

Corsi di Laurea in

Quantum Science and Engineering

Dipartimento di Fisica E. Pancini e Dipartimento di Ingegneria Elettrica e delle Tecnologie dell'Informazione (www.fisica.unina.it)

2022/23

Perchè ISCRIVERSI?

The gold rush towards Quantum Technologies

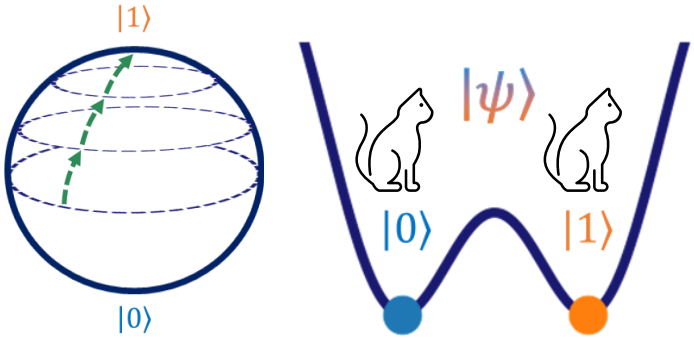
Quantum technologies (QT) have radically innovative characteristics and have an intersectorial impact, in strong discontinuity with the technologies available today. The transformation that is envisaged is disruptive, QT having direct and far-reaching repercussions in many fields, from information technology to biology, from telecommunications to engineering, from chemistry to pharmaceuticals, from medicine to the environment. Some quantum solutions are already on the market. At national level the great interest is testified by special measures dedicated to QT in the National Research Plan (PNR) 2021-2027 and in the Piano nazionale ripresa resilienza (PNRR) under the framework of both the National Center C1 on High Performance Computing, with a special spoke dedicated to Quantum Computation, and the Extended Partnership PE4, entirely devoted to Quantum Technologies. Building on continental scientific excellence, the European Commission launched the 10-year Quantum Flagship program funded with 1 billion euros in 2018 for research and development projects unde

Admission Requisites

For the admission to the Master Degree in QS&E it is necessary to have a bachelor's degree or an equivalent title, with a study plan where credits have been achieved in the following disciplines:

- 24 CFUs in Math (MAT/01-MAT/08);
- 12 CFUs in Physics (FIS/01-FIS/08);
- 6 CFUs in Computer Science INF/01, ING-INF/05;
- 12 additional CFUs in any the following SSDs: FIS/01-FIS/08 Physics; MAT/07 Mathematical Physics; CHIM/01-CHIM/02-CHIM/03 Chemistry; ING-IND/06; ING-IND/10; ING-IND/11; ING-IND/12; ING-IND/13; ING-IND/18; INGIND/19; ING-IND/20; ING-IND/22; ING-IND/31; ING-INF/01; ING-INF/02; ING-INF/06; ING-INF/07 Engineering.

English level B2 is also required.



Degree in Quantum Science and Engineering

First Year

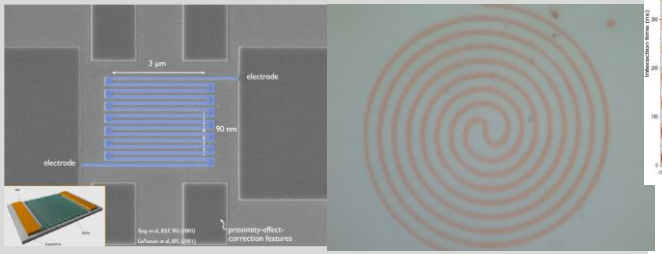
Foundations of Quantum Mechanics (12 CFU)
Microwave Circuits and Technologies (6 CFU)
Digital Electronics for Quantum Applications (6 CFU)
Principles of Quantum Communication (6 CFU)
Quantum Computation (12 CFU)
Applied Quantum Systems (9 CFU)
Quantum circuit electrodynamics and Quantum devices (9 CFU)

Second year

3 Additional courses to be chosen in the list below (18 CFU)
3 Additional courses to be chosen by the student (18 CFU)
Additional training activities (3 CFU)
Final test (21 CFU)

Additional Courses

Physics of quantum information
Quantum optics
Quantum simulators
Quantum materials and solid-state qubits
Advanced computer programming
Quantum software
Quantum metrology and sensors
Advanced Quantum Communication Networks
Quantum detectors for fundamental science
Superconducting Quantum Technologies
Quantum chemistry
Nanoscale Processing and Characterization for Advanced Devices
Nonlinear systems
Quantum Measurement Theory
Quantum Algorithms
Quantum detectors for applied science
Mathematics of quantum mechanics
Mathematical methods for quantum information



The Master Degree in QS&E offers very relevant job opportunities as experts in quantum technologies for cutting-edge research activities in high-Tech industries, research centers and Universities. Graduates in QS&E are entitled: i) to develop applications, systems and services based on quantum technologies aimed at quantum information and computation, quantum communication, quantum simulation, quantum sensors and metrology; ii) to develop quantum software; iii) to carry out advanced research in the field of quantum science and engineering, tackling fascinating problems in every area.