

2nd level Master in Quantum Science & Technology

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Abstract: We present the new 2nd level Master in QS&T recently started at the University of Bari, and highlight the role played by the industrial collaborations.

A new 2nd level Master in Quantum S&T has been proposed and organized by the Physics Department of the University and Polytechnique of Bari within both NQSTI and the MUR Excellence project QUASIMODO (Quantum Sensing and Modeling for One Health). A strong contribution toward its success has been given by the intense outreach and TT activity carried on within NQSTI, which has led to overall 12 partnerships, 11 with companies (Exprivia, GAP, Leonardo, LuxQuanta, Planetek Italia, Optoprim, QTI, Quandela, Qureca, Quside, Xanadu) and 1 with a research institute (CNR-INO Florence).

The Master seeks to satisfy the growing request for quantum scientists and technologists enabling companies to actively participate in the ongoing second quantum revolution. The main objective of the Master is to provide a solid know-how, competences and problem solving skills in Quantum Science and Technologies, from quantum computing to quantum machine learning, quantum communications, quantum imaging and sensing, with a strong focus on use-cases of industrial interest. The Master is open to all STEM graduates. The course shall complement theoretical knowledge with essential modelling, programming and optimization methods and tools to strengthen research-oriented careers within industrial contexts. Integration of core subjects with weekly seminars will also lead to form a forward-looking perspective on the development of quantum science and technologies, and their potential application in the most diverse scenarios (e.g., finance, security, pharmacological chemistry, aerospace, defense, logistic and automotive, biomedical and health).

The Master takes advantage of the robust environment of research groups from the Physics Department of the University and Polytechnique of Bari and companies with a strong interest in Quantum Science and Technology and aims to decisively contribute to create a stimulating collaborative environment between academia and industry in order to enable students to pursue successful careers in the developing field of Quantum Technologies.

Both industrial partners and international external experts have been involved in the Technical Scientific Committee of the Master and have actively contributed to the organization of the Master; this has enabled adopting best practices and orienting the courses and overall Master organization toward industrial needs.

All industrial partners have declared a strong interest toward hiring students upon completion of the Master, also with the intention of supporting their further professional growth toward a PhD. The partnerships have in fact brought to the financing 9 fellowships, ranging between 5.000 and 20.000 euros, as well as to the offer of in-kind services, from teaching activity to support in education and communication activities. Beside the need for Quantum Technologists, a strong motivation toward partnerships has been the benefit we have offered to our partners by reserving free seats for their employees.

Industrial fellowships, over 500 hours of required internship in attractive and highly competitive quantum projects, together with its highly flexible and personalized program (2 mandatory courses and 9 eligible ones) are the peculiar aspects of this Master program, and have certainly contributed to its attractiveness and competitiveness in the international panorama.

Communication through a dedicated and attractive website <https://www.masterquantum.it/>, combined with the institutional one (<https://www.uniba.it/it/didattica/master-universitari/master-ii-livello/master-di-ii-livello-a-a-2024-2025/quantum-science-e-technologi>), video, social media accounts (e.g., Instagram, LinkedIn <https://www.linkedin.com/company/masterquantumbari/posts/?feedView=all>, with over 600 followers) was combined with in-person advertisements (e.g., “Fiera del Master”, conferences and summer schools).

On January 7th 2025, 14 strongly motivated and highly qualified participants (9 subscribed to the entire Master and 5 to single courses, of which: 6 physicist, 3 engineer, 1 mathematician, 1 chemist, 1 computer scientist, and two economist) have started attending the Master courses and are looking forward to attend the cycle of seminars organized to enable our partners to present the available internship projects and attract our students toward a 5-month internship.

An opening event is being organized in March for celebrating the start of the 1st edition of the Master, as well as for advertising the Master to both companies and young STEM graduates, in view of attracting more company employees and establishing new partnerships.