



**UNIVERSITÀ  
DI TRENTO**

**QUANTUM SCIENCE AND TECHNOLOGIES  
TRANSDISCIPLINARY PROGRAMME  
a.y. 2023-2024**

**FUNDAMENTAL COURSES (9 cfu)**

- Quantum Sensing, A. Quaranta M. Lobino (3 credits – PhD in Physics)
- Quantum Computing - P. Hauke (6 credits - Master in Physics)
- Quantum Machine Learning – E. Blanzieri (6 credits – Master in Computer Science)
- Many-body Physics with ultracold atoms and light – A.Recati / I.Carusotto (3 credits – PhD in Physics)

**RECOMMENDED OPTIONAL COURSES**

- Entanglement in Many-Body Systems: from Concepts to Algorithms, M. Rizzi - Humbolt Fellow at BEC Center (PhD in Physics)
- Advanced topics in quantum information theory - A. Legramandi and S. Singha Roy (PhD in Physics)
- Quantum phases of matter: From Landau theory to topological order - S. Bandyopadhyay and R. Costa de Almeida (PhD in Physics)
- Engineered quantum nanosystems: theoretical methods and experiments - G. Rastelli e A. Vinante (PhD in Physics)
- Silicon Radiation Detectors, Gian-Franco Dalla Betta (PhD in MMSE)
- Imaging Sensors, Lucio Pancheri (PhD in MMSE)
- Optical Properties of Nanomaterials, A. Quaranta (PhD in MMSE)
- Requirements Engineering using AI and for AI, A. Perini - A. Susi (PhD in IECS)
- Fundamental Interactions, R. Iuppa (Master in Physics)
- Quantum Optics, I. Carusotto (Master in Physics)
- Quantum Mechanics, Fields and Symmetries, W. Leidemann (Master in Physics)
- Quantum Gases and Superfluidity, S. Giorgini (Master in Physics)
- Quantum Field Theory I, A. Perego (Master in Physics)
- Quantum Field Theory II, L. Vanzo (Master in Physics)
- Ultracold Atoms, G. Lamporesi – A. Recati (Master in Physics)
- Atomic Physics, G. Ferrari (Master in Physics)
- Tensor Decomposition for Big Data Analysis, A. Bernardi (Master in Mathematics)
- Data analysis and exploration, M. Lauria (Master in Mathematics)

Graphical models and network science, V. Vinciotti (Master in Mathematics)

Mathematical Physics Quantum Relativistic Theories, V. Moretti (Master in Mathematics)

Modern Physics, G.A. Prodi (Master in Mathematics)

Discrete Fourier analysis, A. Meneghetti (Master in Mathematics)

Topics in Mathematical Physics of Quantum Theories, R. Brunetti (Master in Mathematics)

Applied Cryptography, M. Calderini (Master in Mathematics)

Scientific computing, R. Nürnberg (Master in Mathematics)