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Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references at the end of each chapters.
Nota di contenuto	Introduction -- Practical Quantum Measurements -- Introductory Theory of Optical Tweezers -- The Total Information Carried by the Light -- The Quantum Noise Limit for a Specific Measurement -- Characterizing Quadrant Detection -- Interferometer Enhanced Particle Tracking -- Homodyne Based Particle Tracking -- Lock-In Particle Tracking -- Selective Measurement by Optimized Dark-Field Illumination Angle -- Technical Constraints on Sensitivity -- Surpassing the Quantum Limit -- Biological Measurement Beyond the Quantum Limit -- Sub diffraction-Limited Quantum Imaging of a Living Cell -- Further Extensions -- Summary and Conclusion.
Sommario/riassunto	This thesis reports on the development of the first quantum enhanced microscope, and on its applications in biological microscopy. The first quantum particle-tracking microscope, described in detail here, represents a pioneering advance in quantum microscopy, which is

shown to be a powerful and relevant technique for future applications in science and medicine. The microscope is used to perform the first quantum-enhanced biological measurements -- a central and long-standing goal in the field of quantum measurement. Subdiffraction-limited quantum imaging is achieved, also for the first time, with a scanning probe imaging configuration allowing 10-nanometer resolution. .