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	Nota di bibliografia	Includes bibliographical references at the end of each chapters.
	Nota di contenuto	Introduction -- Fundamental Concepts in Linear Optics -- Measurement Induced Entanglement Recovery -- Experimental Demonstration of Nonlocal Effects in the Partial-collapse Measurement and Reversal Process -- Phase Estimation with Weak Measurement Using a White Light Source -- Quantum Simulation of Landau-Zener Model Dynamics Supporting the Kibble-Zurek Mechanism -- Conclusion and Prospect.
	Sommario/riassunto	This thesis reports on outstanding work in two main subfields of quantum information science: one involves the quantum measurement problem, and the other concerns quantum simulation. The thesis proposes using a polarization-based displaced Sagnac-type interferometer to achieve partial collapse measurement and its reversal, and presents the first experimental verification of the nonlocality of the partial collapse measurement and its reversal. All of the experiments are carried out in the linear optical system, one of the earliest experimental systems to employ quantum communication and

quantum information processing. The thesis argues that quantum measurement can yield quantum entanglement recovery, which is demonstrated by using the frequency freedom to simulate the environment. Based on the weak measurement theory, the author proposes that white light can be used to precisely estimate phase, and effectively demonstrates that the imaginary part of the weak value can be introduced by means of weak measurement evolution. Lastly, a nine-order polarization-based displaced Sagnac-type interferometer employing bulk optics is constructed to perform quantum simulation of the Landau-Zener evolution, and by tuning the system Hamiltonian, the first experiment to research the Kibble-Zurek mechanism in non-equilibrium kinetics processes is carried out in the linear optical system.