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Sommario/riassunto	This doctoral thesis has a dual focus. Firstly, it studies the generation of non-classical states of light through strong-field processes, where light-matter interactions involve light intensities contending with the forces binding electrons to their nuclei. This exploration demonstrates the utility of strong-field phenomena in generating non-classical states of light, with properties dependent on specific dynamics and materials involved in the excitation. Secondly, it investigates the constraints and prerequisites of non-classical light sources—beyond those studied in the first part—for advancing quantum communication applications,

specifically in quantum key distribution. The aim here is to create a secret key exclusively known by the communicating parties for encrypting and decrypting messages. As a whole, this work serves as a foundational step towards leveraging strong-field physics as a prospective tool for quantum information science applications, as well as displaying the advantages and limitations of photonic-based setups for quantum key distribution. With its very clear style of presentation, the book is an essential reference for future researchers working in this field.