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Nota di contenuto	Introduction -- Part I: Theory -- Theory Foundations -- Theoretical Predictions and Simulation -- Part II: The Experimental Setup -- The Large Hadron Collider -- The ATLAS Experiment -- Particle Reconstruction and Identication in ATLAS -- Part III: Search for New Physics in Final States with One Lepton Plus Missing Transverse Momentum at s = 13 TeV -- Motivation -- Analysis Strategy -- Analysis -- Statistical Interpretation -- Conclusion and Outlook -- Part IV: High-mass Drell-Yan Cross Section Measurement at s = 8 TeV -- Motivation -- Analysis Strategy -- Analysis of the Electron Channel -- Electron Channel Cross Section Measurement -- Muon Channel Cross Section -- Results and Interpretation -- Conclusion and Outlook -- Summary.
Sommario/riassunto	This book presents two analyses, the first of which involves the search for a new heavy charged gauge boson, a so-called W¢ boson. This new gauge boson is predicted by some theories extending the Standard Model gauge group to solve some of its conceptual problems. Decays of the W¢ boson in final states with a lepton ([±] =

e[±], μ[±]) and the corresponding (anti-) neutrino are considered. Data collected by the ATLAS experiment in 2015 at a center of mass energy of sqrt{s}=13 TeV is used for the analysis. In turn, the second analysis presents a measurement of the double-differential cross section of the process pp->Z/gamma^* + X -> l^+l^- + X, including a gamma gamma induced contribution, at a center of mass energy of sqrt{s} = 8 TeV. The measurement is performed in an invariant mass region of 116 GeV to 1500 GeV as a function of invariant mass and absolute rapidity of the l^+l^-- pair, and as a function of invariant mass and pseudorapidity separation of the l^+l^-- pair. The data analyzed was recorded by the ATLAS experiment in 2012 and corresponds to an integrated luminosity of 20.3/fb. It is expected that the measured cross sections are sensitive to the PDFs at very high values of the Bjorken-x scaling variable, and to the photon structure of the proton.