

1. Record Nr.	UNINA9910725087203321
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Titolo	Towards Global Interpretation of LHC Data : SM and EFT Couplings from Jet and Top-Quark Measurements at CMS // by Toni Mäkelä
Pubbl/distr/stampa	Cham : , : Springer Nature Switzerland : , : Imprint : Springer, , 2023
ISBN	9783031297793 9783031297786
Edizione	[1st ed. 2023.]
Descrizione fisica	1 online resource (173 pages)
Collana	Springer Theses, Recognizing Outstanding Ph.D. Research, , 2190-5061
Disciplina	539.736
Soggetti	Particles (Nuclear physics) Quantum field theory Elementary Particles, Quantum Field Theory Particle Physics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	1. Introduction -- 2. The role of jets and the top quark in the Standard Model -- 3. Effective field theory -- 4. LHC measurements -- 5. Extraction of the top quark MSR mass using CMS data -- 6. The xFitter QCD analysis framework -- 7. Interpretation of CMS measurements in terms of SM parameters and search for new physics -- 8. Summary and conclusions -- Appendix A: NNLO QCD analysis with the k-factor approach.
Sommario/riassunto	This book presents the first global interpretation of measurements of jet and top quark production at the Large Hadron Collider, including a simultaneous extraction of the standard model parameters together with constraints on new physics, unbiased from the assumptions on the standard model parameters. As a long-standing problem, any hadron collider search for new physics depends on parton distribution functions, which cannot be predicted but are extracted experimentally. However, performing the extraction in the same kinematic region where physics beyond the standard model is expected to manifest causes the risk of absorbing the new physics effects into the parton distributions. In this book, the issue is addressed by extending the

standard model by effective contributions from quark contact interactions describing new physics and extracting the parton distributions and standard model parameters simultaneously with setting limits on the contact interactions. In the process, the most precise single measurement of the strong coupling constant at the LHC is performed, to date. Furthermore, the book details the first investigation of the mass renormalization scale dependence of the top quark mass, highlighting the importance of a proper scale choice for obtaining robust predictions and improving the precision of experimental analyses. The initial chapters provide the reader with a succinct yet accessible introduction to the relevant theoretical and experimental topics. The presented investigations are at the edge of precision in the phenomenology of high-energy physics and serve to pave the road toward a global interpretation of LHC data. .
