1. Record Nr. UNINA9910427688403321

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Titolo	Searches for Supersymmetric Particles in Final States with Multiple Top and Bottom Quarks with the Atlas Detector / / by Chiara Rizzi
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2020
ISBN	3-030-52877-4
Edizione	[1st ed. 2020.]
Descrizione fisica	1 online resource (XIX, 279 p. 164 illus., 152 illus. in color.)
Collana	Springer Theses, Recognizing Outstanding Ph.D. Research, , 2190-5053
Disciplina	539.72
Soggetti	Elementary particles (Physics) Quantum field theory Mathematical physics Elementary Particles, Quantum Field Theory Theoretical, Mathematical and Computational Physics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Standard Model and Supersymmetry -- LHC and ATLAS -- Proton-Proton Interactions and Their Simulationproton-Proton Interactions and Their Simulation -- Event Reconstruction -- Statistical Methods -- Common Aspects to SUSY searches with Multiple b-jets and ETmiss -- Search for Gluino Air Production -- Search for Higgsino Pair Production -- Comparison with Other ATLAS and CMS Searches -- Conclusion -- Appendix.
Sommario/riassunto	This PhD thesis documents two of the highest-profile searches for supersymmetry performed at the ATLAS experiment using up to 80/fb of proton-proton collision data at a center-of-mass energy of 13 TeV delivered by the Large Hadron Collider (LHC) during its Run 2 (2015-2018). The signals of interest feature a high multiplicity of jets originating from the hadronisation of b-quarks and large missing transverse momentum, which constitutes one of the most promising final state signatures for discovery of new phenomena at the LHC. The first search is focused on the strong production of a pair of gluinos, with each gluino decaying into a neutralino and a top-antitop-quark pair or a bottom-antibottom-quark pair. The second search targets the

pair production of higgsinos, with each higgsino decaying into a gravitino and a Higgs boson, which in turn is required to decay into a bottom-antibottom-quark pair. Both searches employ state-of-the-art experimental techniques and analysis strategies at the LHC, resulting in some of the most restrictive bounds available to date on the masses of the gluino,neutralino, and higgsino in the context of the models explored.