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Nota di contenuto	Introduction -- Theoretical Framework -- Event Simulation -- Reconstruction of Physics Objects -- Common Aspects in Searches for New Physics in $t\bar{t}$ Final States with Additional Heavy-Favor Jets -- Statistical Analysis -- Searches for New Physics in $t\bar{t}$ Final States with Additional Heavy-Flavor Jets -- Conclusions. .
Sommario/riassunto	This PhD thesis focuses on the search for new phenomena in top-antitop quark (tt) final states with additional b-quark jets at the LHC. It uses the full Run 1 dataset collected by the ATLAS experiment in proton-proton collisions at s=8 TeV. The final state of interest consists of an isolated lepton, a neutrino and at least six jets with at least four b-tagged jets, a challenging experimental signature owing to the large background from tt+heavy-flavor production. This final state is characteristic of ttH production, with the Higgs boson decaying into bb, a process that allows direct probing of the top-Higgs Yukawa coupling. This signature is also present in many extensions of the Standard Model that have been proposed as solutions to the hierarchy problem, such as supersymmetry or composite Higgs models, which

predict the pair production of bosonic or fermionic top quark partners, or the anomalous production of four-top-quark events. All these physics processes have been searched for using an ambitious search strategy that has been developed on the basis of a combination of state-of-art theoretical predictions and a sophisticated statistical analysis to constrain in-situ the large background uncertainties. As a result, the most restrictive bounds to date on the above physics processes have been obtained.