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Soggetti	Particles (Nuclear physics) Quantum field theory String models Elementary Particles, Quantum Field Theory Quantum Field Theories, String Theory
Lingua di pubblicazione	Inglese
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Nota di contenuto	Preamble -- Introduction to Higgs Boson Pair Production -- Experimental Apparatus -- The L1 Trigger -- Event Selection and Categorization -- Modelling of Physics Processes -- Results on HH $bb + -$ -- Future prospects for HH searches -- Conclusions -- Appendix.
Sommario/riassunto	This thesis presents innovative contributions to the CMS experiment in the new trigger system for the restart of the LHC collisions in Run II, as well as original analysis methods and important results that led to official publications of the Collaboration. The author's novel reconstruction algorithms, deployed on the Field-Programmable Gate Arrays of the new CMS trigger architecture, have brought a gain of over a factor 2 in efficiency for the identification of tau leptons, with a very significant impact on important H boson measurements, such as its decays to tau lepton pairs and the search for H boson pair production. He also describes a novel analysis of HH $bb$ tautau, a high priority physics topic in a difficult channel. The original strategy, optimisation of event categories, and the control of the background have made the result one of the most sensitive concerning the self-coupling of the

Higgs boson among all possible channels at the LHC.

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