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Top quark pair production in association with a Higgs boson at CMS

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Summary

With the recent observation at both CMS and ATLAS experiments of a new particle with mass of 125 GeV consistent with the Higgs boson, it becomes more prioriatal to test whether the new particle is consistent with the Standard Model. In particular, measurement of its properties like couplings to other bosons and fermions is one of he main tasks at present. The dominant decay mode of the light Higgs boson is a decay to a b quark pair. This final state is heavily dominated by multijet background which can be significantly reduced by looking for associated production of a Higgs boson with a top quark pair. This production mode is also sensitive to the couplings of Higgs to the two heaviest fermions in the Standard Model. The main background of this process is production of a top quark pair in association with 2 additional b quarks which has the same signature. Approach used for minimisation of this background and optimisation for the next run of the LHC will be presented.

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