Higgs Boson Decays into b Quarks

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The discovery of a Higgs boson with a mass of around 125 GeV in 2012 at the Large Hadron Collider (LHC) by the ATLAS and CMS experiments was a milestone in particle physics. This discovery - as well as more and more precise measurements of Higgs boson properties carried out afterwards - has been driven by decays of the Higgs boson into pairs of vector bosons (photons, W and Z bosons) which leave distinct signatures in the detectors.

At the observed mass of around 125 GeV, however, the dominant decay mode of the Standard Model Higgs boson is in a pair of b quarks, which are fermions and thus acquire their mass in the Brout-Englert-Higgs mechanism through Yukawa couplings.

Observing the decay H->bb and measuring its properties are thus essential to further determine the nature of the discovered Higgs boson.

Because of the overwhelming background from jet production in the gluon fusion process, production processes with additional particles, e.g. vector bosons (W,Z) or top quark pairs, are investigated.

The talk summarises the results of the searches for the decay of the Higgs boson into b quarks in the past Run 1 of the LHC. Furthermore, the role of this decay mode in searches for new physics beyond the Standard Model is briefly discussed and an outlook to the LHC Run 2, just about to start, is given.