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NNLO+PS predictions for Higgs production in bottom-quark fusion with MiNNLO

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With the growing precision of experimental measurements, combining fixed-order perturbative calculations with parton-shower effects becomes essential for an accurate description of LHC phenomenology. In this talk, we focus on the computation of Higgs production via bottom-quark annihilation ($b\bar{b}H$) at next-to-next-to-leading order (NNLO) in QCD perturbation theory, consistently matched with parton showers (NNLO+PS) using the MiNNLOPS technique. We extend the MiNNLOPS framework to accommodate a scale-dependent Yukawa coupling renormalized in the \overline{MS} scheme. Given the flexibility in schemes for the $b\bar{b}H$ process calculation, where the bottom quark can be treated as massless or massive at the LHC production scale, we explore both the five-flavour scheme (5FS) with massless bottom quarks and the four-flavour scheme (4FS) incorporating massive bottom quarks. In the 4FS computation, we employ the MiNNLOPS method tailored for the QQF scenario, featuring a heavy quark (Q) and a color singlet final state (F).

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