

# Probing the light quark Yukawa couplings through rare exclusive Higgs boson decays

*Tuesday 30 May 2017 17:30 (2 minutes)*

Following the discovery of a Higgs boson with a mass of about 125 GeV, subsequent measurements have confirmed its central role in the spontaneous breaking of electroweak symmetry. Currently, a wide-reaching programme of measurements is being proposed both for the HL-LHC and future electron-positron colliders to clarify the properties of the observed Higgs boson. Nevertheless, its role in the generation of fermion mass, in particular for the first and second generation, is still unclear. In the Standard Model (SM) this is implemented in an ad hoc manner through Yukawa interactions, and many beyond-the-SM theories offer rich phenomenology and exciting prospects for the discovery of New Physics in this sector.

The measurement of the rare exclusive decays  $H \rightarrow V\gamma$ , where  $V$  denotes a vector meson, is a unique probe of the Higgs boson coupling to light quarks, and provides sensitivity to a multitude of BSM scenarios. These measurements constitute a programme which is unique to hadron collider facilities due to the required large sample of Higgs bosons: a 100 TeV FCC-hh would be an ideal facility to measure these otherwise inaccessible quantities.

The sensitivity of a FCC-hh to probe these exclusive Higgs boson decays is assessed for the first time, and the potential to test the Standard Model and constrain new physics models is discussed.

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**Session Classification:** Poster session