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Prospects for constraining light-quark electroweak couplings at Higgs factories

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Electroweak Precision Measurements are stringent tests of the Standard Model and sensitive probes to New Physics. Accurate studies of the Z-boson couplings to the first-generation quarks could reveal potential discrepancies between the fundamental theory and experimental data. Future e+e- colliders offering high statistics of Z bosons would be an excellent tool to perform such a measurement based on comparison of radiative and non-radiative hadronic decays. Due to the difference in quark charge, the relative contribution of the events with final-state radiation (FSR) directly reflects the ratio of decays involving up- and down-type quarks. Such an analysis requires proper modeling and statistical discrimination between photons coming from different sources, including initial-state radiation (ISR), FSR, parton showers and hadronisation. In our contribution, we show how to extract the values of the Z couplings to light quarks and present the estimated uncertainties of the measurement.

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