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Determination of the first-generation quark couplings at the Z-pole

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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, which are currently only constrained from LEP data, could reveal potential discrepancies from the theory predictions. Future e^+e^- colliders running at the Z-pole would be an excellent tool for an analysis based on a comparison of radiative and non-radiative Z boson decays.

We present the corresponding method to extract the values of the Z couplings to light quarks and discuss the uncertainty of the measurement, including contributions from various systematic effects. We show that systematic uncertainty in the heavy-flavour tagging performance is the key factor in the analysis and reducing it to a sub-permille level might be crucial to fully profit from the high luminosity of future e^+e^- machines. In such a case, the measurement could improve the LEP results by at least an order of magnitude.

Secondary track

T07 - Flavour Physics and CP Violation

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