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3rd Generation Quark and Electroweak Boson Couplings at the 250 GeV stage of the ILC

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The 3rd generation quarks are, due to their large mass, highly sensitive probes for new physics connected to the electroweak symmetry breaking. While top quark pair production requires center-of-mass energies of larger than 350 GeV, the first stage of the ILC at a center-of-mass energy of 250 GeV can perform precision measurements of bottom quark pair production, thereby settling the long standing ˜3\sigma tension between the LEP experiments and SLD. For this measurement, the polarised beams of the ILC are of special importance as they enable the separation of the vector and axial-vector couplings of the b quark to Z boson and photon. Another important precision probe for new physics are triple gauge boson coupings (TGCs). Thanks to the polarised beams and the much higher luminosity, a significant increase in precision beyond past and present experiments is expected at the first stage of the ILC for the TGCs involving W bosons. For both measurements, we will report recent projections based on detailed simulations of the ILD detector concept, and highlight the role of important detector performance aspects, e.g. for the separation of b and anti-b jets based on vertex charge measurements and particle ID.

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