PAUL SCHERRER INSTITUT

Particle Theory Seminar

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"Three- and Fourparton Contributions to the Heavy-Quark Forward–Backward Asymmetry"

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Abstract:

In my diploma-thesis I considered the forward–backward asymmetry of the process $e^- + e^+ \to \gamma^*/Z^* \to Q + \overline{Q} + X$ with massive quarks $Q, \overline{Q}$ and $X \in \{g, gg, q\overline{q}\}$. The forward–backward asymmetry can be measured with high accuracy and allows a precise determination of the effective weak mixing angle $\sin^2 \theta_{W,\text{eff}}$. Therefor I calculated the amplitudes for the three- and fourparton contributions in the spinorhelicity formalism. The phase-space integration was performed numerically using Monte-Carlo methods. Within the numerical integration the dipole subtraction method was used to regularize the occurring infrared divergencies.