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The spin-dependent quark beam function at NNLO

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The question of how the nucleon's spin is distributed among the partons is one of the important unsolved problems in physics and has recently received substantial attention from experimental measurements. In order to fully exploit these measurements an accurate theoretical description of the observables is required. The N-jettiness subtraction scheme provides a framework in which the desired accuracy can be achieved.
In this talk I present the calculation of the beam function for longitudinally polarized quarks through next-to-next-to-leading order (NNLO) in QCD perturbation theory. This is the last missing ingredient needed to apply the factorization theorem for the N-jettiness event-shape variable in polarized collisions through the NNLO level. A special emphasis is given to the computational techniques, used to perform this computation and the treatment of the fifth gamma matrix in dimensional regularization.
The NNLO polarized quark beam function is an essential ingredient for describing polarized collisions at NNLO precision. Therefore its knowledge is a big step towards extending the global fit of the polarized proton structure to the NNLO level.

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