Contribution ID: **49**   Type: **not specified**

Structure of transverse momentum dependent (TMD) distributions at NNLO

Wednesday, 1 June 2016 12:30 (30 minutes)

In this work we perform the detailed analyses of TMD operators and provide a complete calculation at next-to-next-to leading order of unpolarized transverse momentum dependent parton distribution functions (TMD-PDF) and fragmentation functions (TMDFF) for all flavor combinations. Our analysis is made in general framework without any reference to a specific process. We recover the known results for parton distribution functions and provide new results for the fragmentation functions. We obtain for the first time results also for the transverse momentum dependent gluon fragmentation functions at one and two loops. The analytical properties of the distribution functions, the cancellation of rapidity divergences and the details of the calculation are also discussed.

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Session Classification: Talks