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Determining Transverse Momentum Dependent Parton Distribution Functions with Monte Carlo generators

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Transverse Momentum Dependent (TMD) parton distribution is a very powerful concept for the description of low and high transverse momentum effects in high energy collisions. The Parton Branching (PB) method provides TMD distributions that can be used in parton shower simulations, as already implemented in CASCADE Monte Carlo event generator.
We develop a method, PS2TMD, that allows determining effective TMDs from the standard Monte Carlo parton showers. This method is validated and implemented to successfully reconstruct the PB-TMDs with different configuration settings. We also discuss kinematic shifts in longitudinal momentum distributions from initial state showering and point out the sizable influence of different reconstruction definitions on both collinear and transverse momentum PDFs.

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