

Transverse Lambda hyperon polarization at lepton colliders

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We study transverse polarization of Λ hyperons in single-inclusive leptonic annihilation. We show that when the transverse momentum of the Λ baryon is measured with respect to the thrust axis, a transverse momentum dependent factorization formalism is required and the polarization is generated by the TMD polarizing fragmentation function (TMD PFF). However, when the transverse momentum of the Λ baryon is measured with respect to the momentum of the initial leptons, a collinear twist-3 formalism is required and the polarization is generated by the intrinsic collinear twist-3 fragmentation function DT. Using the TMD formalism, we demonstrate that the Λ polarization at OPAL and Belle can be described using the twist-2 TMD factorization formalism. Finally, we make a theoretical prediction for this polarization in the collinear twist-3 formalism at Belle.

Primary author: Prof. 邵, 鼎煜 (复旦大学)

Presenter: Prof. 邵, 鼎煜 (复旦大学)

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