

# XXVIII International Workshop on Deep-Inelastic Scattering and Related Subjects



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## Transverse Lambda polarization in electron-positron collisions

*Thursday, 15 April 2021 10:54 (18 minutes)*

In this talk I will present a study of transverse polarization of lambda-hyperons in single-inclusive leptonic annihilation (SIA). We show that when the transverse momentum of the lambda-baryon is measured with respect to the thrust axis, a transverse momentum dependent (TMD) formalism is required and the polarization is generated by the TMD polarizing fragmentation function (TMD PFF),  $\langle 1_T \rangle$ . However, when the transverse momentum of the lambda-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 twist-3 fragmentation function. Thus, while these measurements differ from one another only by a change in the measurement axis, they probe different distribution functions. Recently, Belle measured a significant polarization in single-inclusive lambda-baryon production as a function of the transverse momentum with respect to the thrust axis. However, this data can in principle be re-analyzed to measure the polarization as a function of the transverse momentum of the lambda-baryon with respect to the lepton pair. This observable could be the first significant probe of the  $\langle 1_T \rangle$  function. In this study, we first develop a TMD formalism for lambda-polarization; we then present a recent twist-3 formalism that was established to describe lambda-polarization. Using the TMD formalism, we demonstrate that the lambda-polarization at Belle and OPAL can be described using the twist-2 factorization formalism. Finally, we make a theoretical prediction for this polarization in the twist-3 formalism at Belle.

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