



The 184rd HENPIC seminar Spin 3/2 hadron: its polarization and fragmentation functions

Speaker: Prof. Tianbo Liu (刘天博)

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ABSTRACT:

The spin, as a fundamental property of all particles, is proven a powerful quantity to test theories and models in hadron physics. The measurement of the polarization of a hadron produced in high energy scatterings provides an opportunity to understand the property of strong interaction. In this seminar, we will discuss the description of the polarization of a hadron, the spin density matrix of a spin-3/2 hadron, and the physical interpretation of the matrix elements. Then we provide a complete definition of quark fragmentation functions (FFs) to spin-3/2 hadrons from the decomposition of the quark-quark correlation matrix. As an application, we derive the differential cross section of the semi-inclusive electron-positron annihilation in terms of the newly defined FFs, which can also be applied in semi-inclusive deep inelastic scattering process for the study of nucleon structures.

ABOUT THE SPEAKER:

Tianbo Liu is a Professor in Shandong University, Qingdao, since 2020. He obtained B.S. and Ph.D. in 2010 and 2015 from Peking University. He held postdoctoral positions at Duke University and Jefferson Lab before joining Shandong University. He received the Gary McCator Award in 2019. His research interest focuses on nucleon spin structures, including transverse momentum dependent parton distribution functions, fragmentation functions, power corrections and radiative corrections, that are closely related to the lepton-hadron deep inelastic scattering experiments at existing facilities and future electron-ion colliders.



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