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Azimuthal and spin asymmetries in e+e− → V πX at high energies and 3D fragmentation functions

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Semi-inclusive vector and pseudoscalar meson production in e

+e− annihilation at high energies is an ideal place to study three dimensional fragmentation functions, especially for the tensor polarization dependent part. We present the complete general kinematic analysis of this process and show that the cross section should be expressed by 81 independent structure functions, and give the results of azimuthal and spin asymmetries as well as hadron polarizations in terms of these structure functions. We also present the parton model calculation results for this process up to twist-3 level in leading order pQCD. We get the relationships between these structure functions and fragmentation functions, also the azimuthal asymmetries and hadron polarization results in the form of convolutions of these fragmentation functions. In this way, we show that these three dimensional fragmentation functions can be accessed in experiments through these measurable quantities.

References
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Presenter: CHEN, Kaibao (Shandong University)

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