Global Analysis of TMD distributions

Workshop on Transverse momentum, spin,
and position distributions of partons in hadrons

June 10-15, 2007 Trento, Italy

- TMD Functions: unpol. PDF/FF, Sivers, Boer-Mulders, Collins ... and transversity

- Processes: $lh_1 \to l'h_2 X$ (SIDIS), $l^+l^- \to h_1 h_2 X$, $h_1 h_2 \to l^+ l^- X$ (DY)

- Hadrons: $p, \bar{p}, n, d, \pi, K$

- Observables: unpol. cross sections, SSA, moments

- Experiments: COMPASS, HERMES, JLAB, RHIC, PAX, JPARC

- Theoretical issues: factorization, evolution, Sudakov suppression, soft factors, χ-odd absolute signs, radiative NLO corrections ...

- Data collection and analysis: binning, acceptance, correlations, ...

- $e^+ e^- \to h_1 h_2 X$: extraction of the Collins f. ?

- Phenomenological analysis: errors (stat., model dependence), functional shapes, Gaussian ansatze, $k_\perp$ dependences for TMD ($q, \bar{q}, g$), physical interpretation (unf. vs. fav.)

SIDIS $[dx\,dQ^2\,dz\,d^2\boldsymbol{p_T}]$:

$f_1 \otimes D_1(1 + \cos(\phi_h))$ $\qquad\qquad$ $h_1^\perp \otimes H_1^\perp \cos(2\phi_h)$

$S_L\, h_{1L}^\perp \otimes H_1^\perp \sin(2\phi_h)$

$S_T\, g_{1T} \otimes D_1 \cos(\phi_h - \phi_S)$ $\qquad$ $S_T\, f_{1T}^\perp \otimes D_1 \sin(\phi_h - \phi_S)$

$S_T\, h_1 \otimes H_1^\perp \sin(\phi_h + \phi_S)$ $\qquad$ $S_T\, h_{1T}^\perp \otimes H_1^\perp \sin(3\phi_h - \phi_S)$

DY (CS frame) $[d\Omega\,dx_1\,dx_2\,d^2\boldsymbol{q_T}]$:

$f_1 \otimes f_1$ $\qquad\qquad$ $h_1^\perp \otimes h_1^\perp \cos(2\phi)$

$S_L\, h_{1L}^\perp \otimes h_1^\perp \sin(2\phi)$ $\qquad$ $S_T\, f_{1T}^\perp \otimes f_1 \sin(\phi - \phi_S)$

$S_T\, h_1 \otimes h_1^\perp \sin(\phi + \phi_S)$ $\qquad$ $S_T\, h_{1T}^\perp \otimes h_1^\perp \sin(3\phi - \phi_S)$

$e^+e^- \rightarrow h_1 h_2 X$

$H_1^\perp \otimes H_1^\perp \cos(2\phi)\,[\cos(\phi_1 + \phi_2)]$

$pp \rightarrow$ photon/ jets/ hadrons ?