

Sivers TMD shift: Dependence on momentum fraction x

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Acknowledgments:
LHPC

Gauge ensemble provided by:
R. Edwards, B. Joó and K. Orginos
(JLab / W&M Collaboration)

x -dependence of Sivers shift

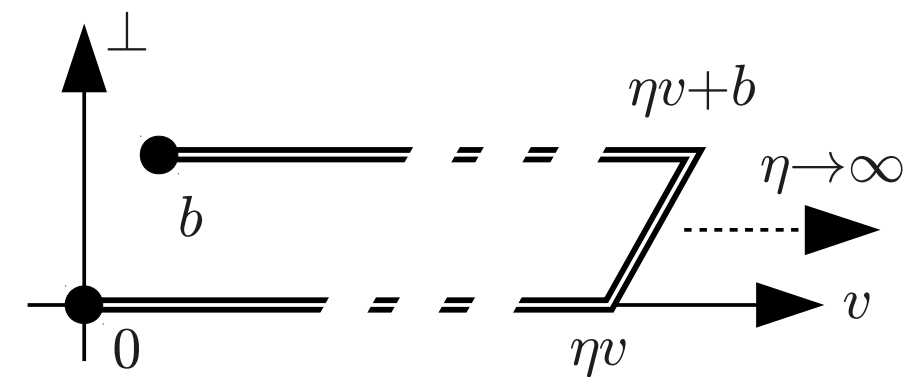
Phenomenological frame: $P_T = v_T = 0, b^+ = 0$

Expressed in Lorentz-invariant fashion: $\frac{v \cdot b}{v \cdot P} = \frac{b \cdot P}{m_N^2} \left(1 - \sqrt{1 + 1/\hat{\zeta}^2} \right)$

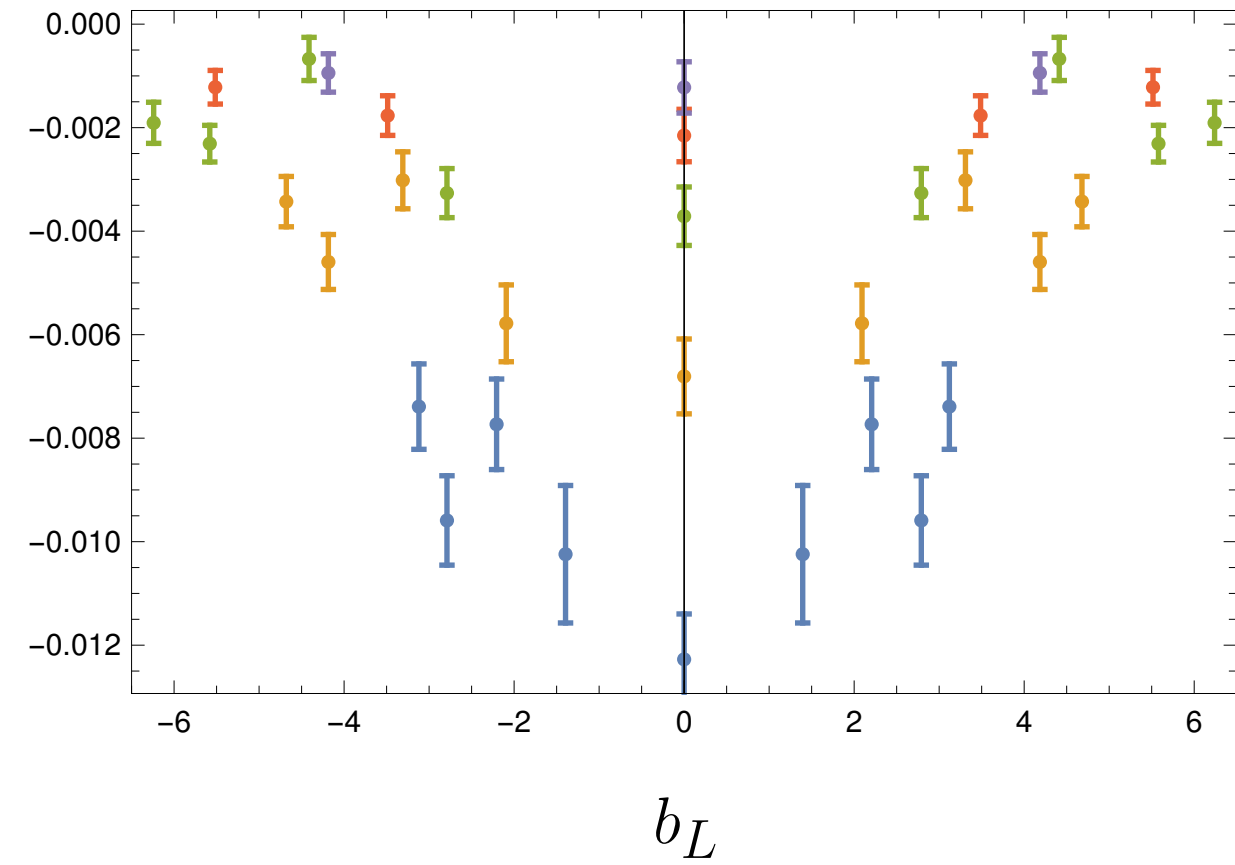
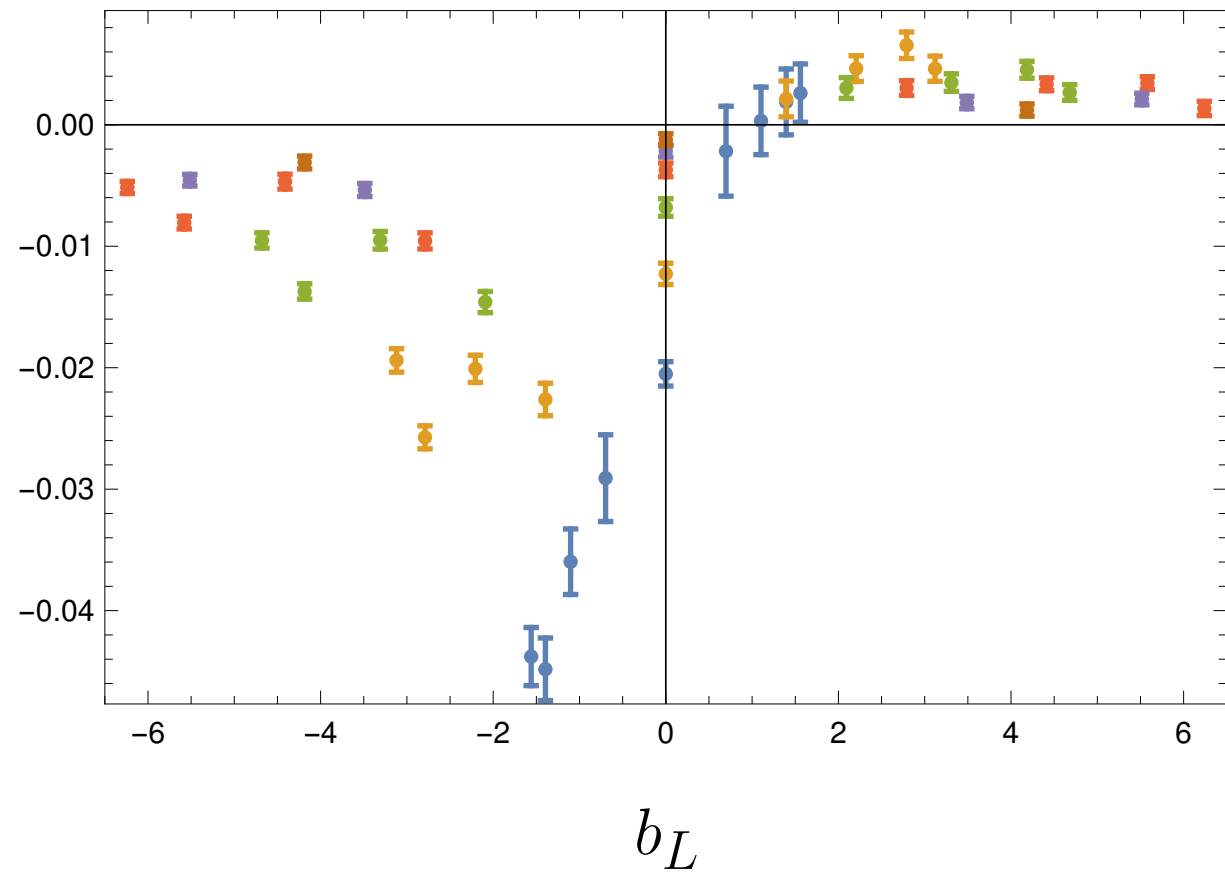
Lattice frame: b, v purely spatial

Constraint forces the use of general off-axis directions

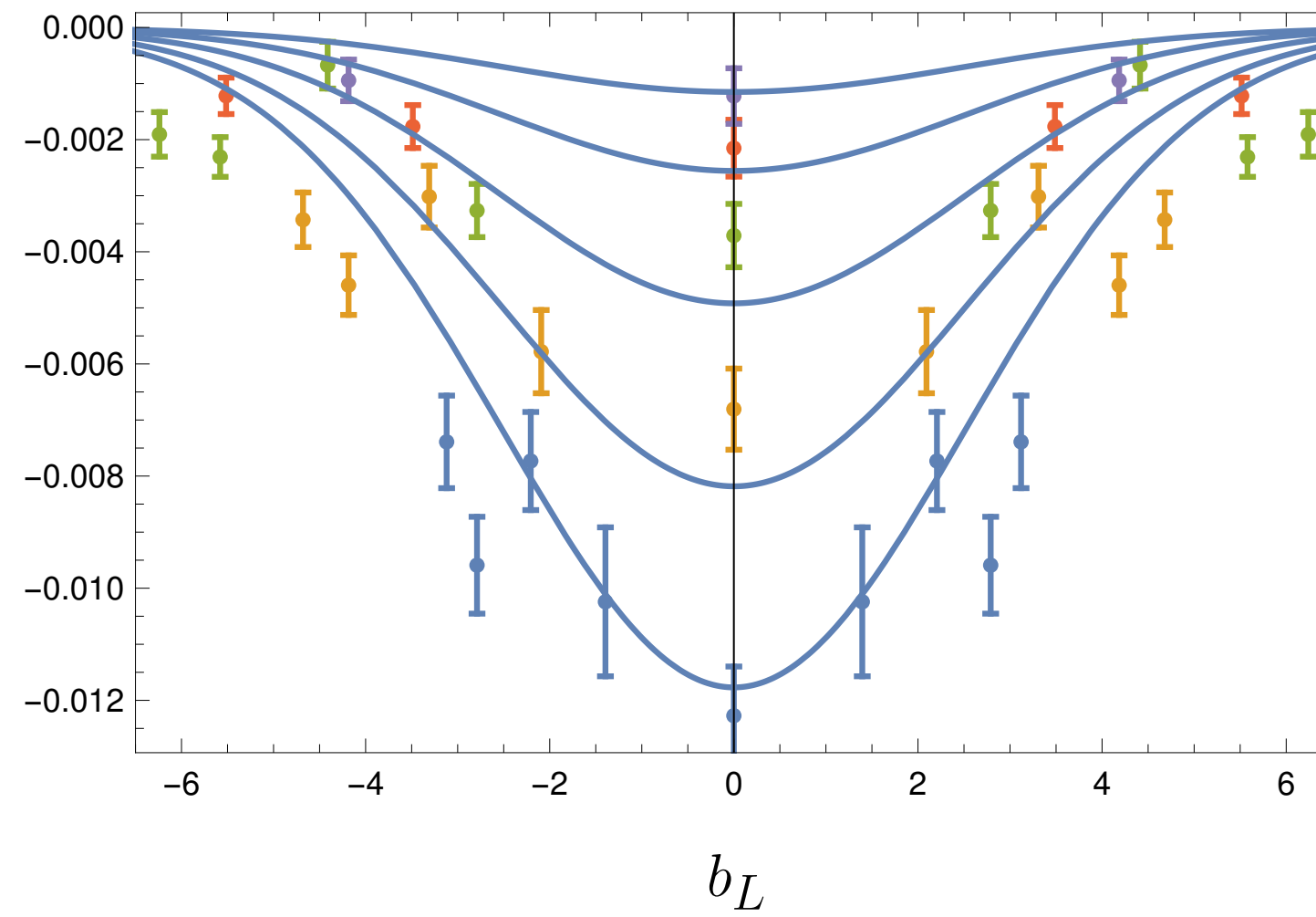
Perform analysis at large staple length



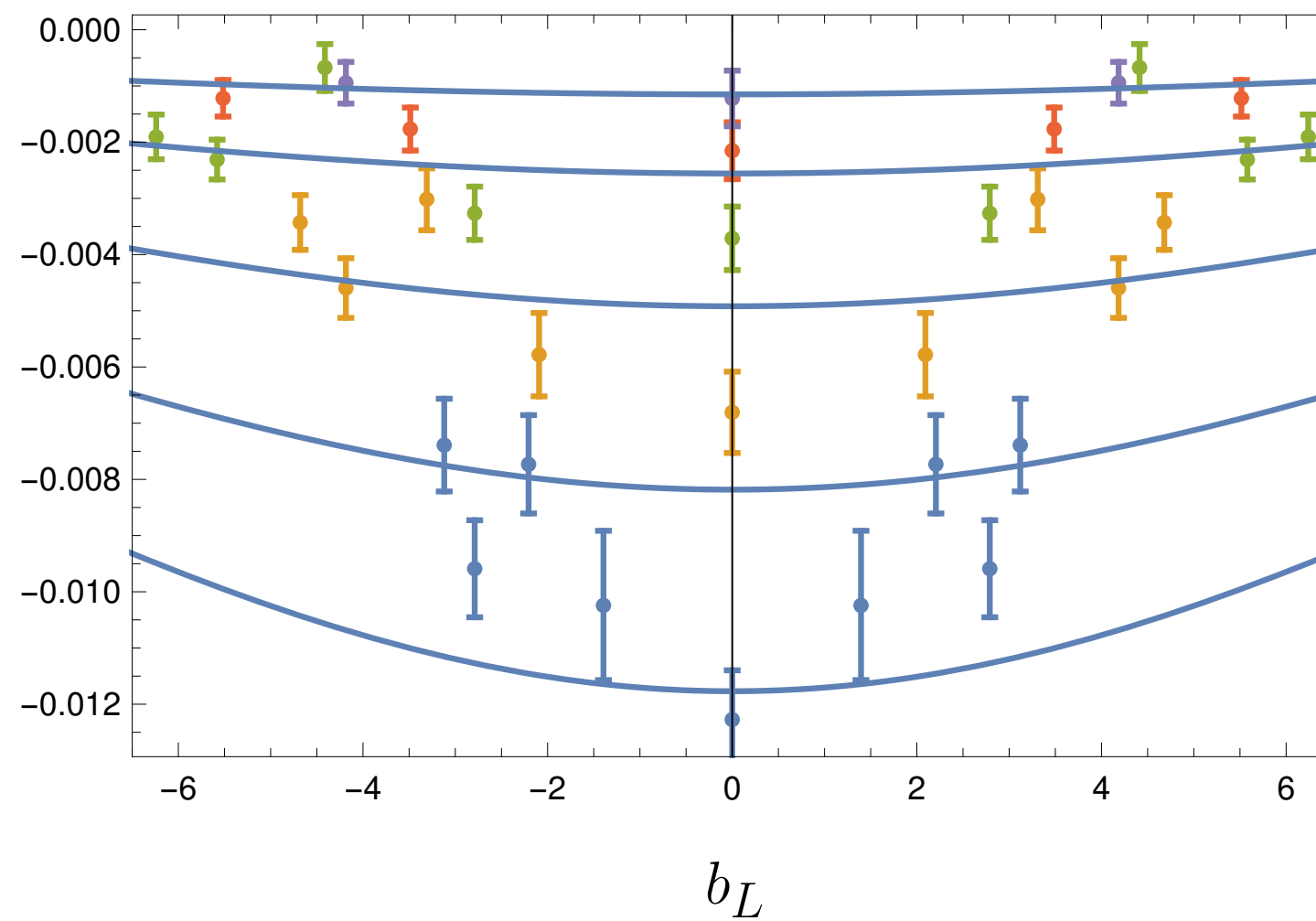
Extract b_L -even component of imaginary part of γ^+ correlator



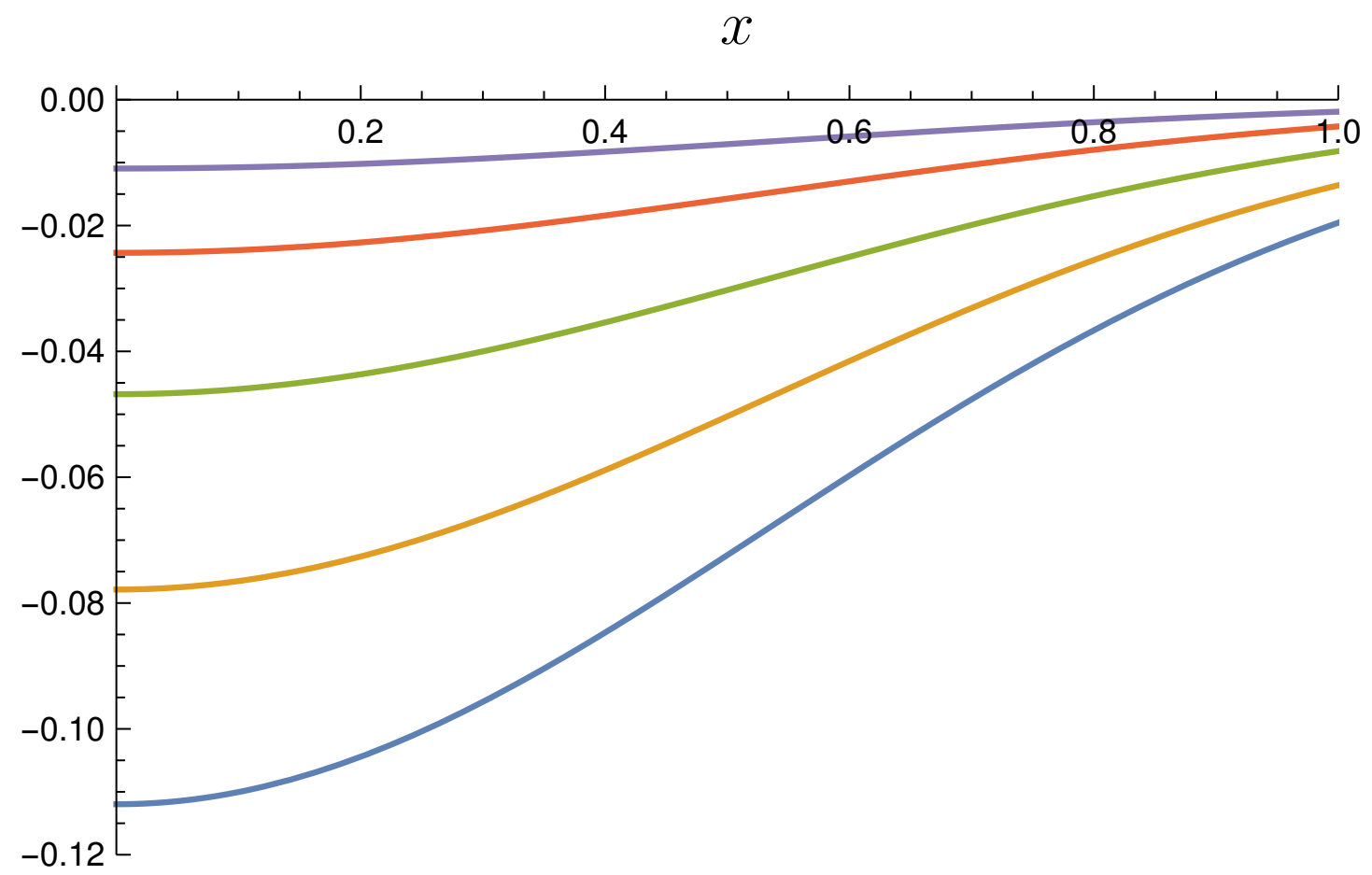
Fit dependence in $b_L, |b_T|$ space



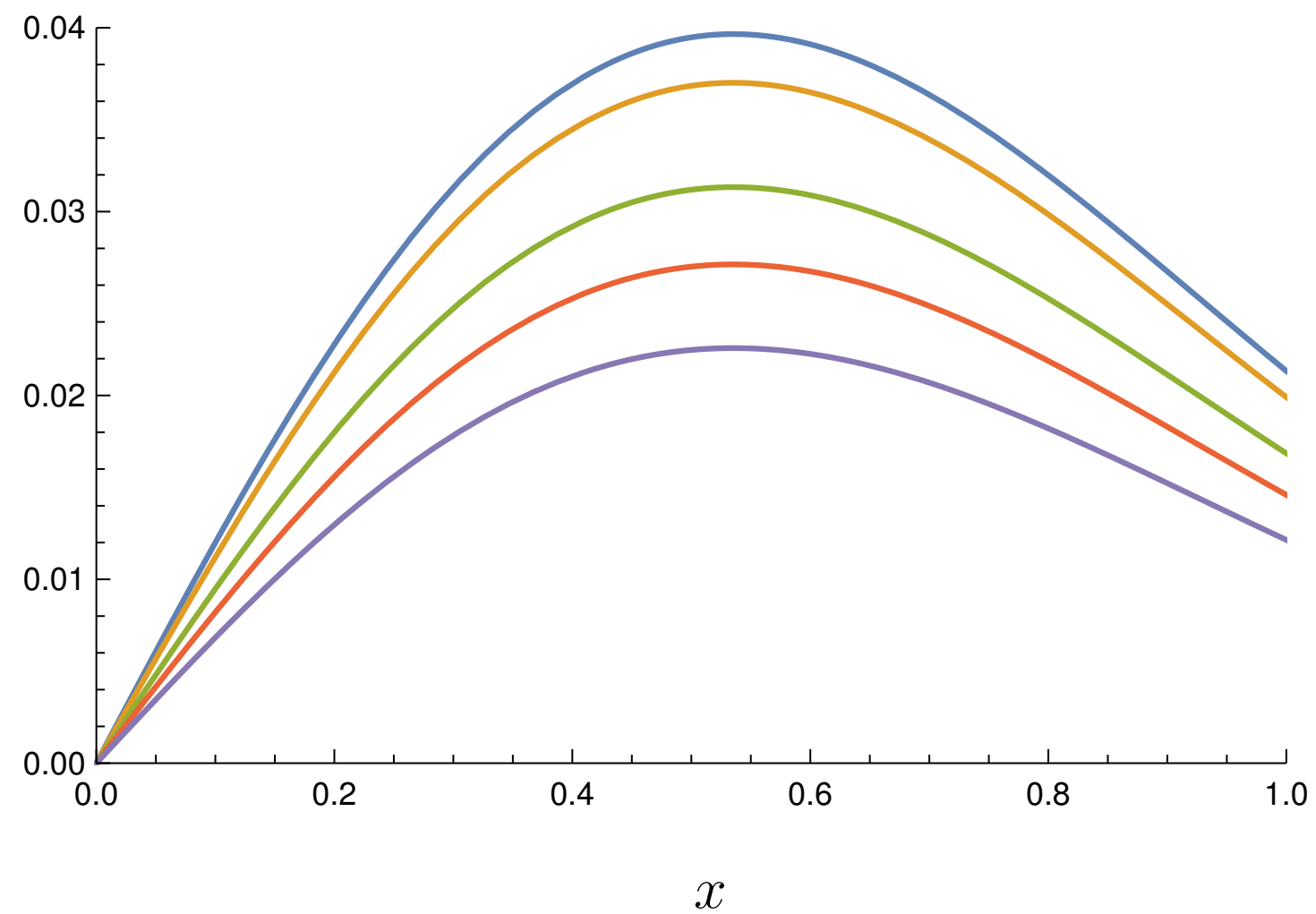
Cast in $b \cdot P, b^2$ space



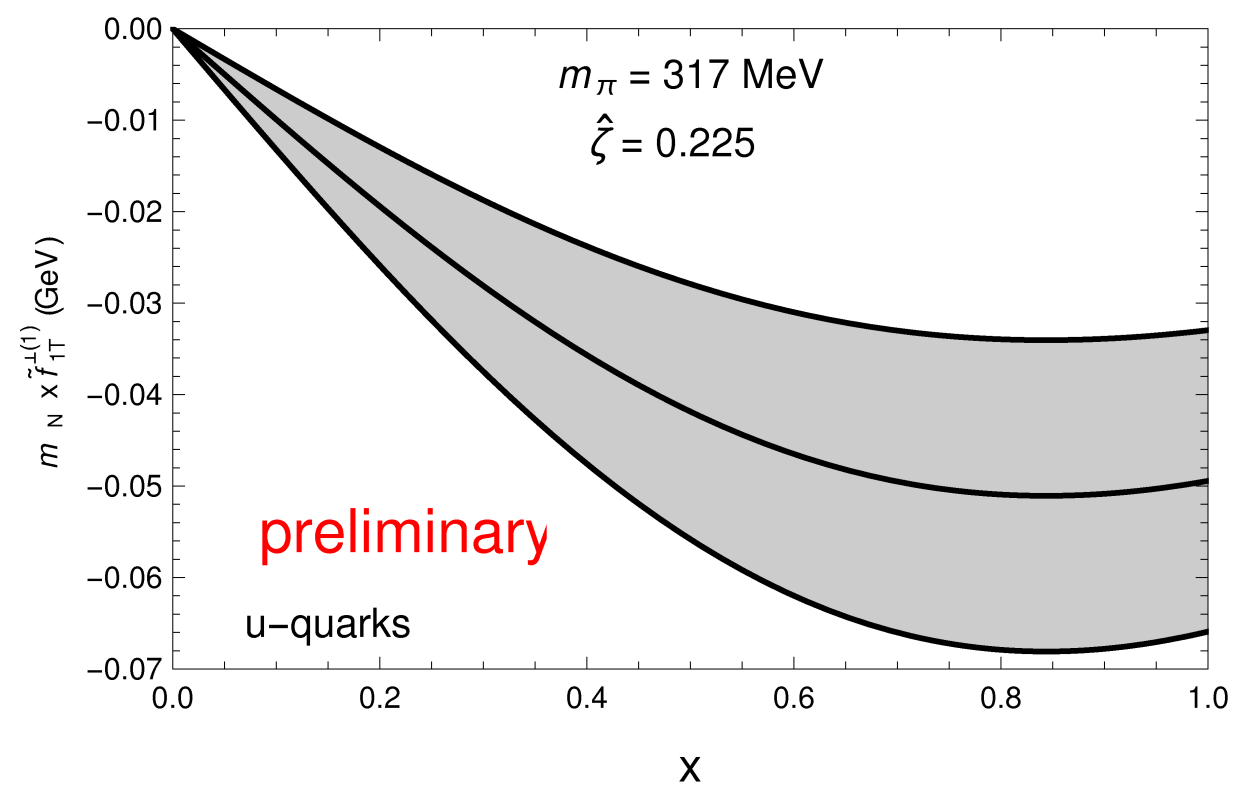
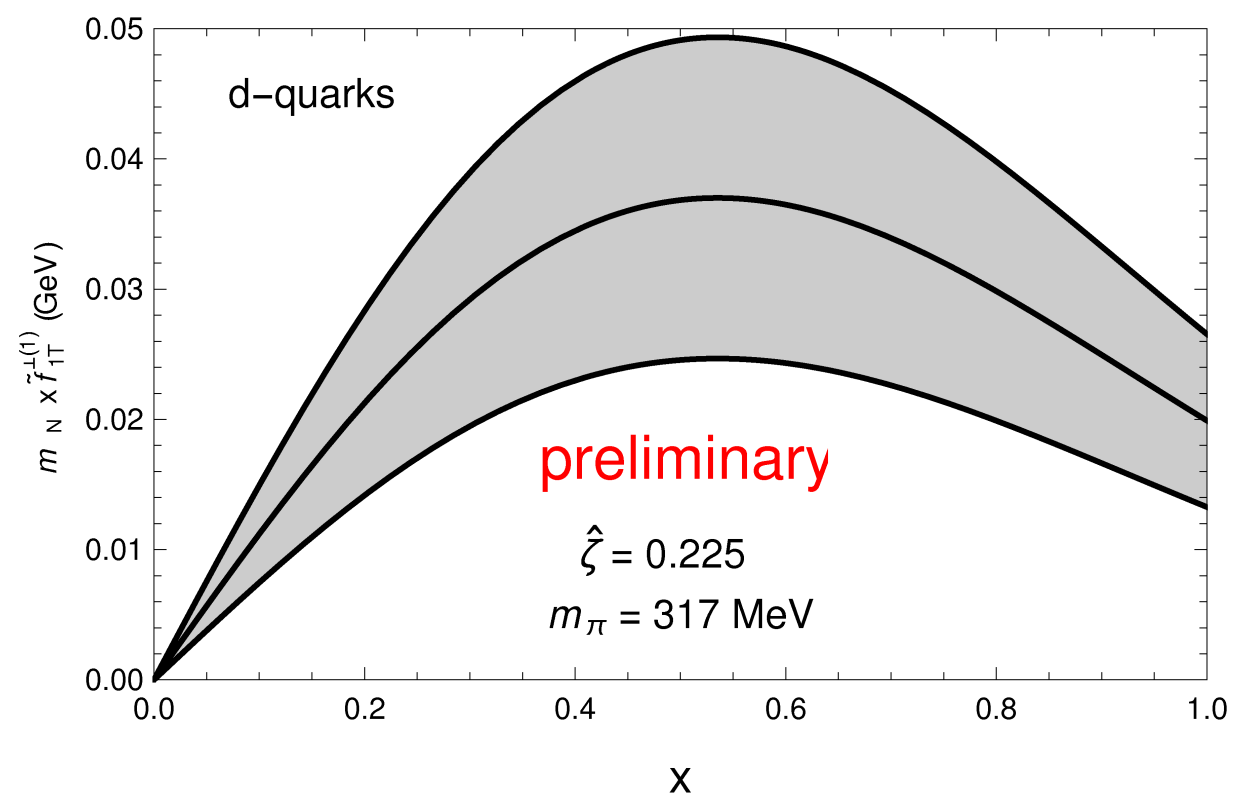
Fourier transform $b \cdot P \longrightarrow x$



Normalize to x -integrated Siverts shift, multiply by x



Eyeball error



Conclusions

Proof of concept: x -dependence of TMDs accessible – are producing data at larger proton momenta (boosted smearing), improving analysis systematics