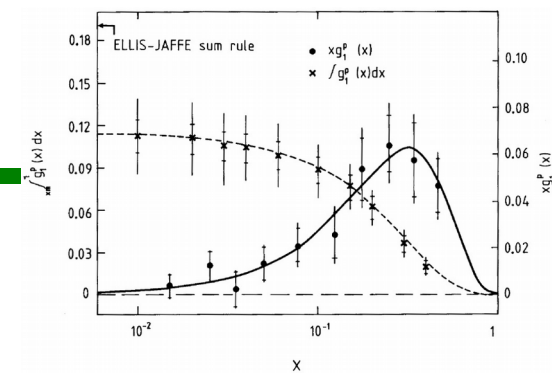




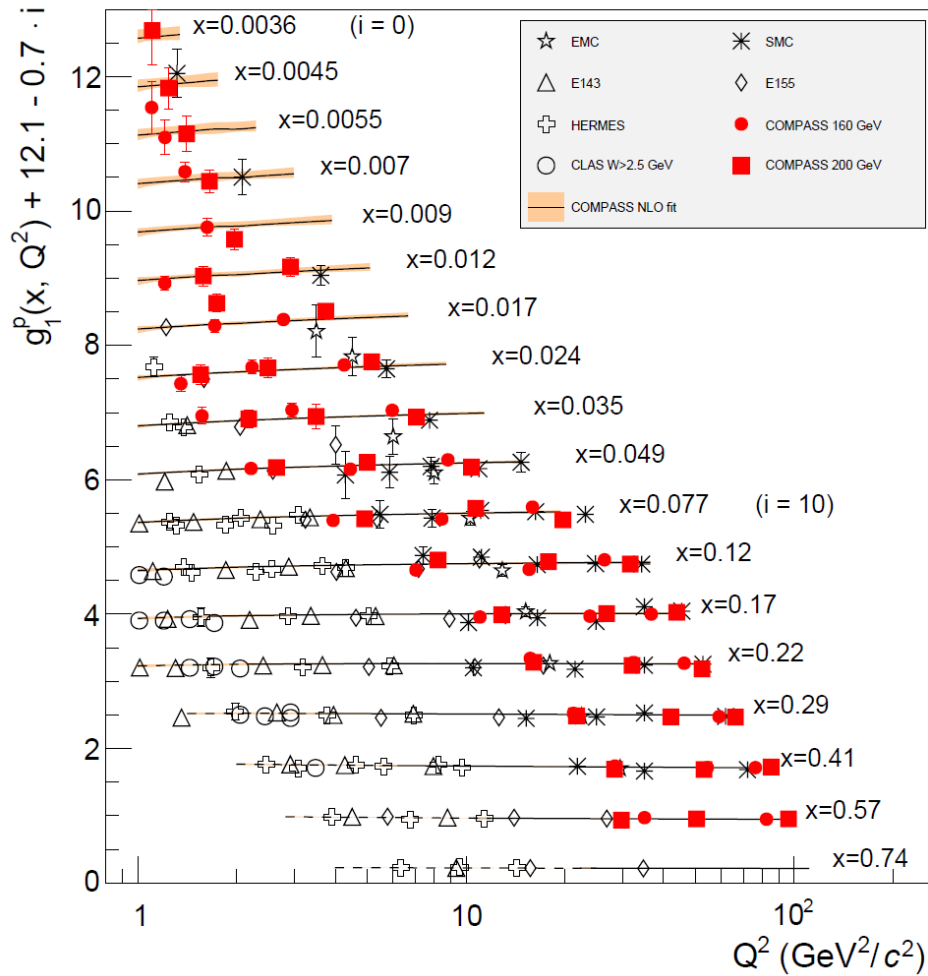
# 偏極深非弾性散乱の成果

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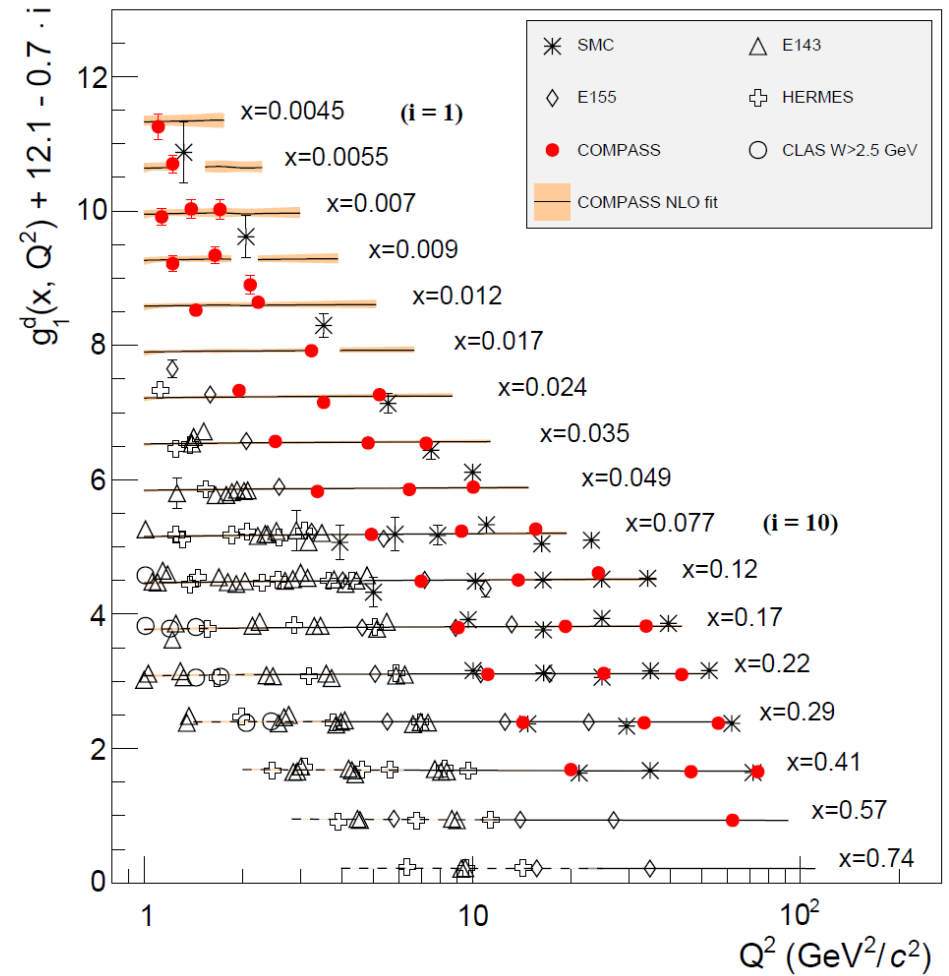
- 標的依存性 → フレーバー分解
- $Q^2$ 発展 →  $\Delta G$ の間接的測定



## proton

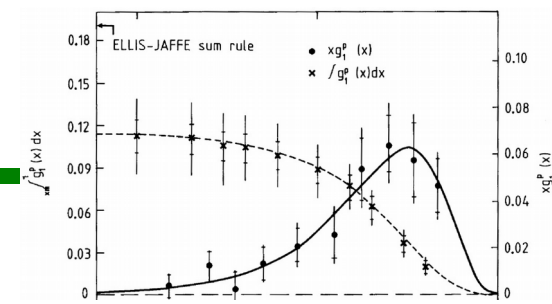


## deuteron





# クォークスピン寄与: $\Delta\Sigma$

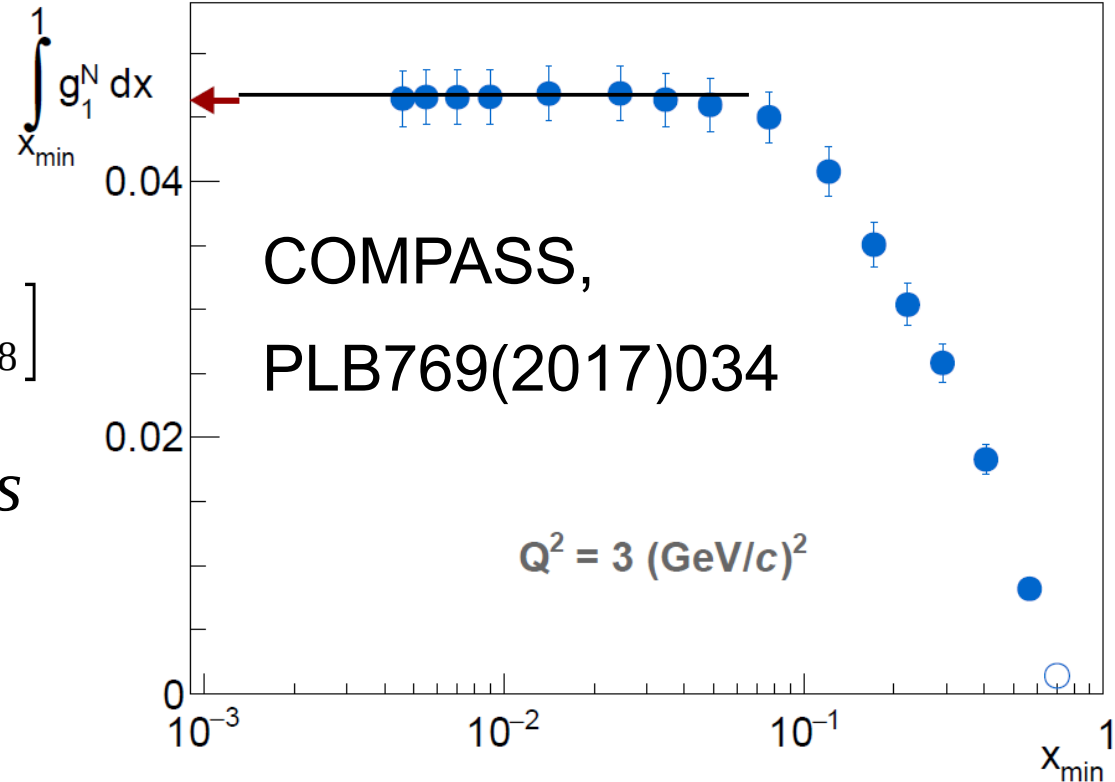


$$\Gamma_1^N(Q^2) = \int_0^1 \frac{g_1^d(x, Q^2)}{1 - 1.5 \omega_D} dx$$

$$= \frac{1}{36} [4 C_S(Q^2) \Delta\Sigma + C_{NS}(Q^2) a_8]$$

$$a_8 = \Delta u + \Delta d - 2 \Delta s$$

$$= 0.585 \pm 0.025$$



$$\Gamma_1^N = 0.046 \pm 0.002 \pm 0.004 \pm 0.005$$

$$\Delta\Sigma = \mathbf{0.32 \pm 0.02 \pm 0.04 \pm 0.05}$$

$$Q^2 = 3 \text{ (GeV/c)}^2$$

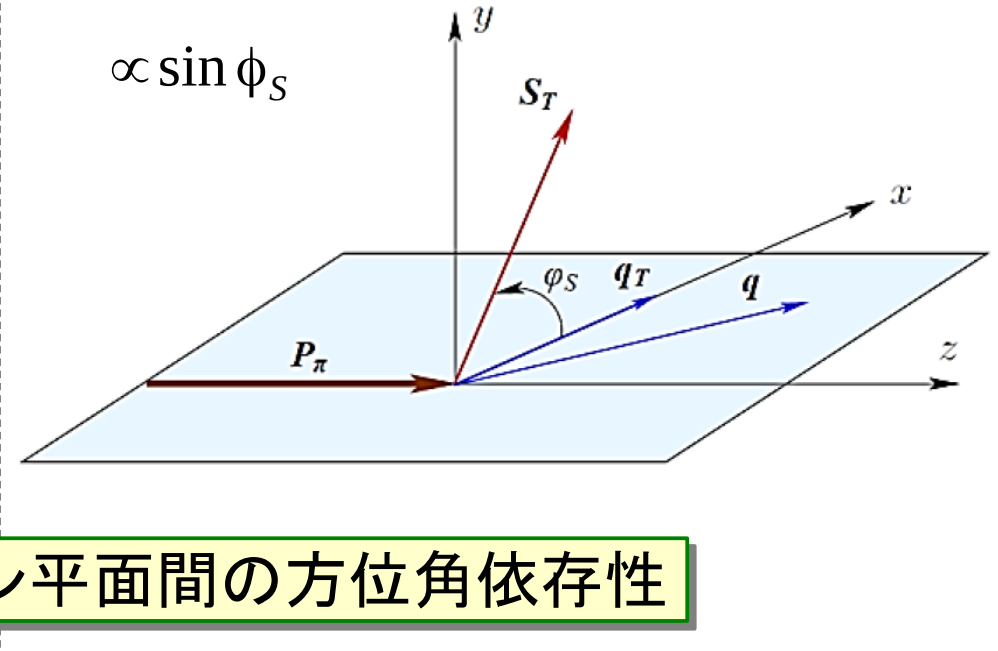
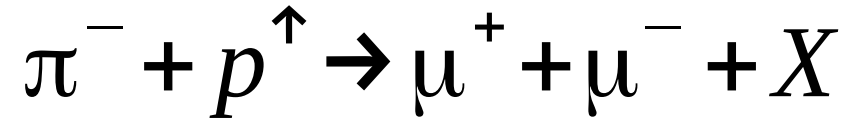
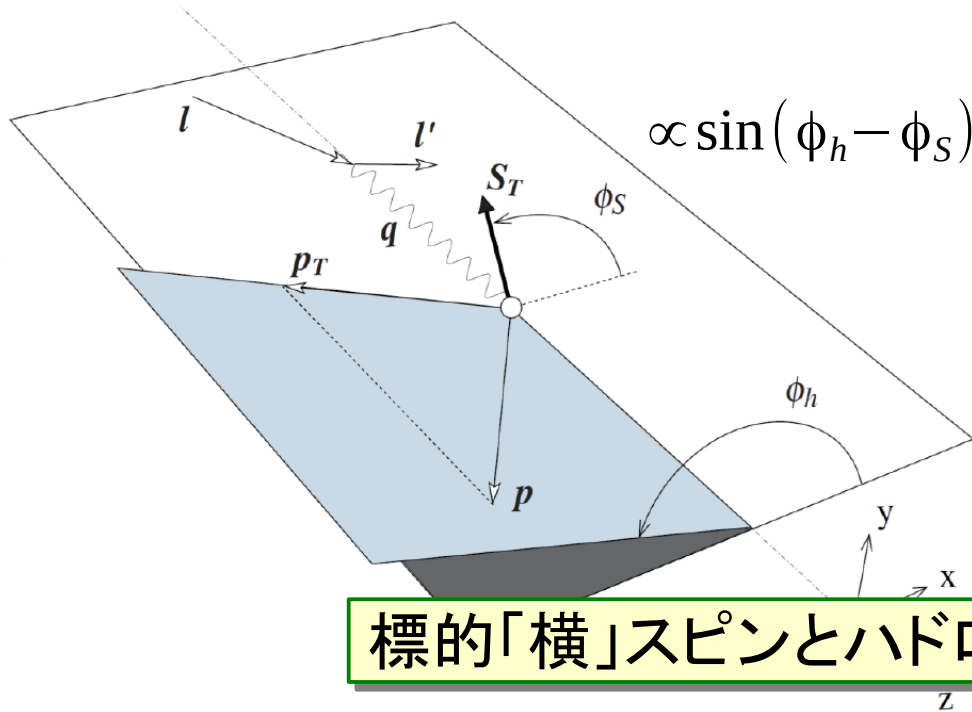
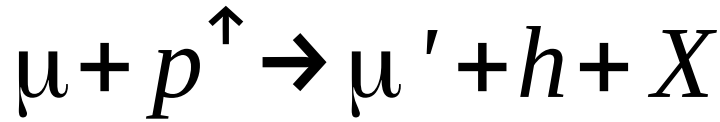


# COMPASS-II polDY



# Sivers Effect in SIDIS and DY

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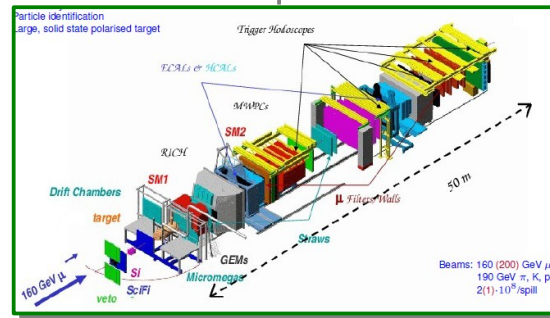
標的「横」スピとハドロン平面間の方位角依存性

$\mu$  beam: 160/200 GeV/c

Pol.  ${}^6\text{LiD}$  target

Pol.  $\text{NH}_3$  target

Data taking: 2002 ~ 2011



$\pi^-$  beam: 190 GeV/c

Pol.  $\text{NH}_3$  target

Data taking: 2014, 2015,

2018



# TMD (Sivers) の "non"-Universality

DIS

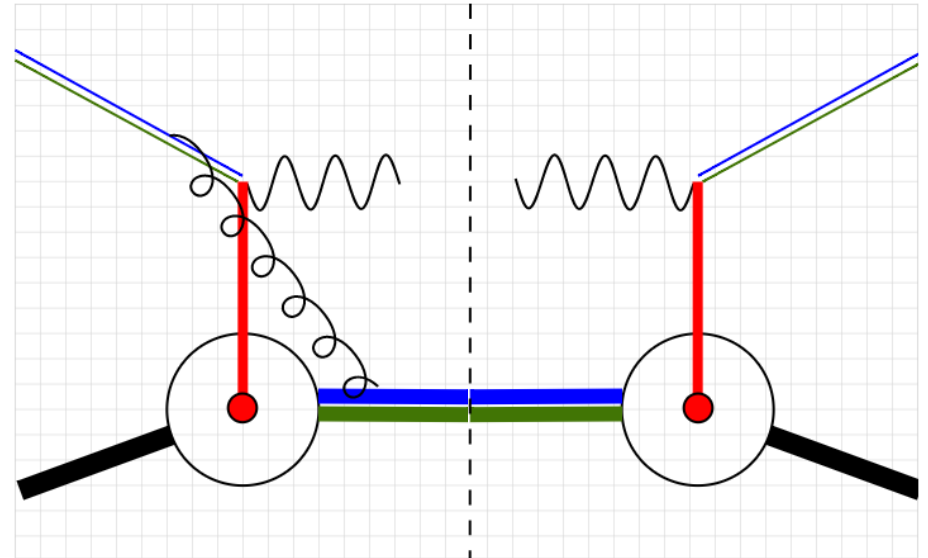
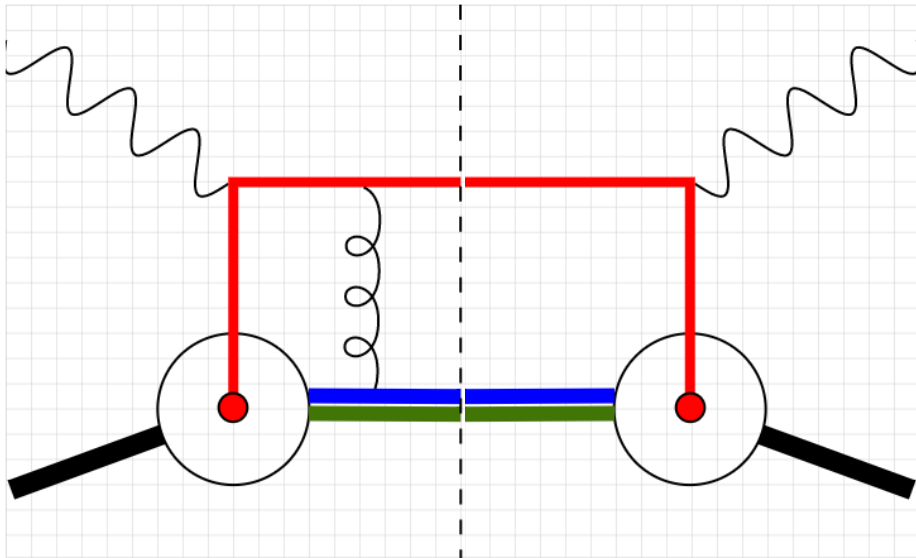
$$\gamma^* + q \rightarrow q'$$

Drell-Yan

$$q + \bar{q} \rightarrow \gamma^*$$

W/Z 生成

$$q + \bar{q} \rightarrow W/Z$$



Sivers: Final state interaction

『引力』

Sivers: Initial state interaction

『斥力』

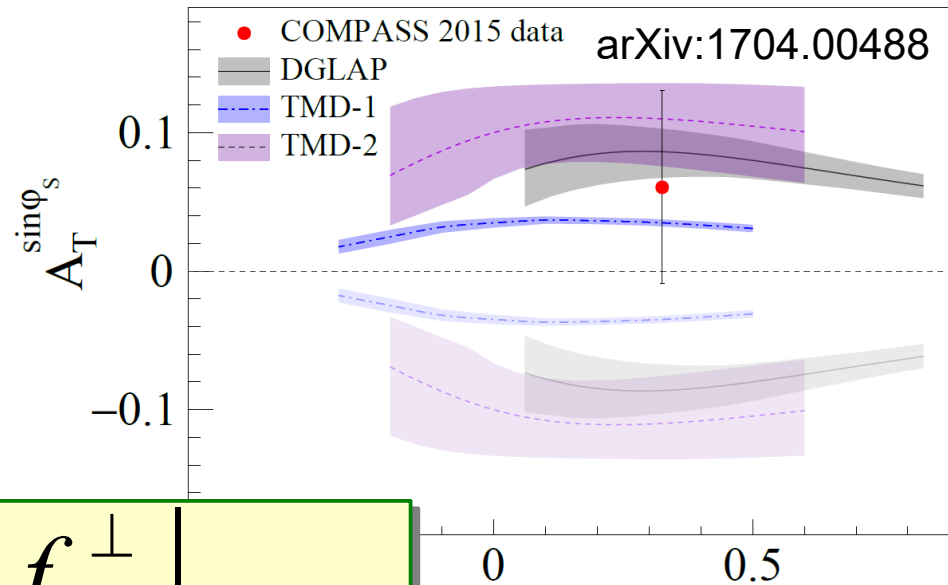
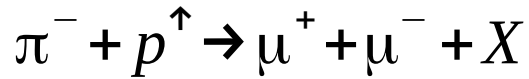
$$f_{1T}^\perp |_{\text{DIS}} = - f_{1T}^\perp |_{\text{DY, W/Z}}$$



# Sivers non-Universality test: DY, W生成

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## COMPASS

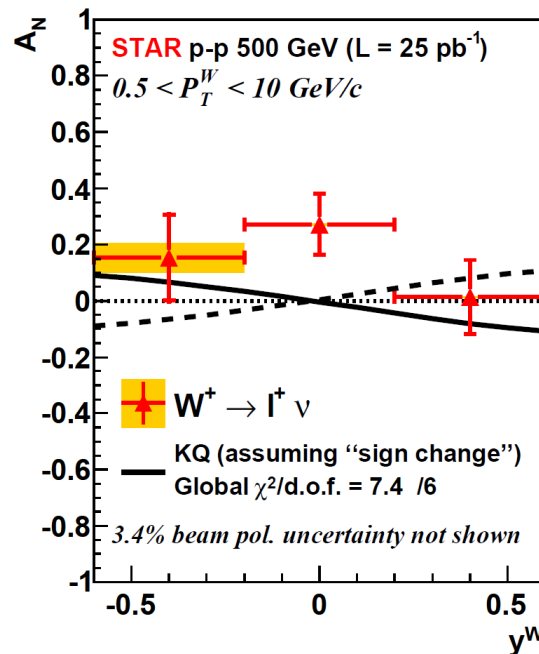
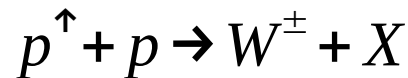


sign change

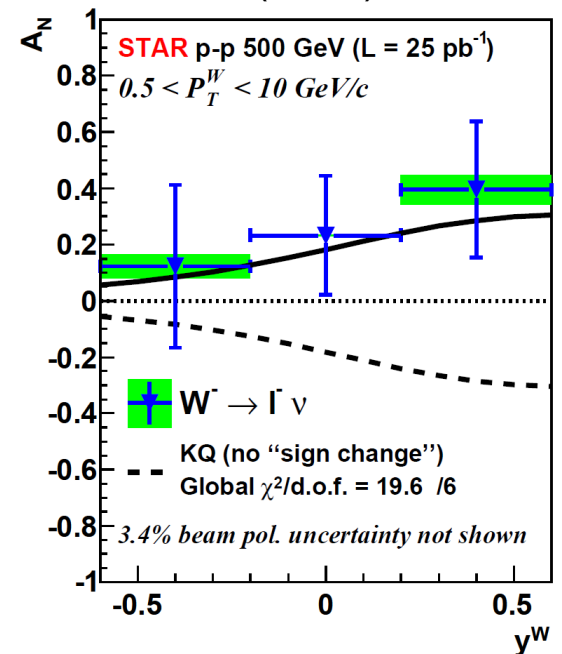
no "sign change"

$$f_{1T}^\perp|_{\text{DIS}} = - f_{1T}^\perp|_{\text{DY, W}}$$

## STAR



x<sub>F</sub> PRL116(2016)132301

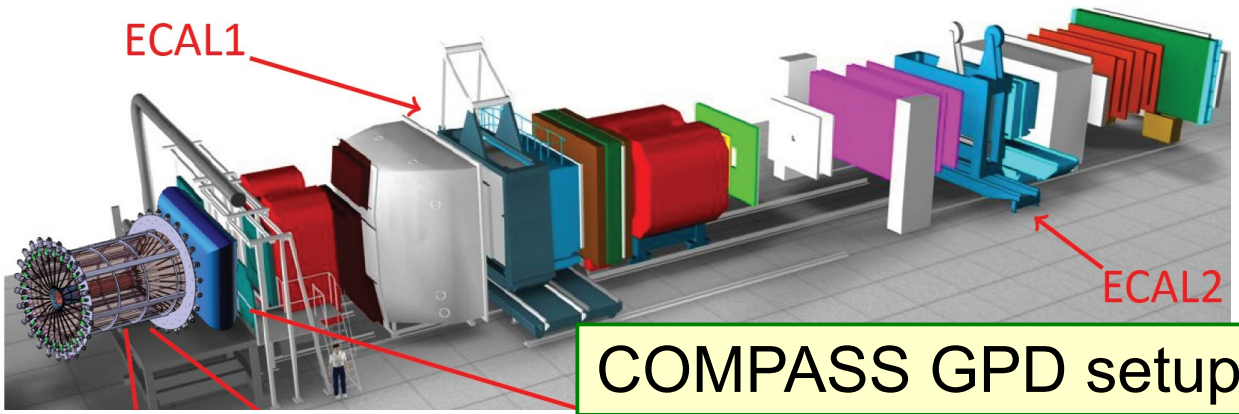
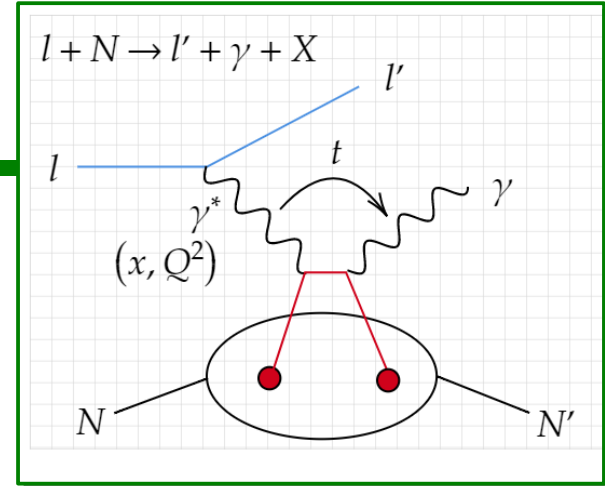




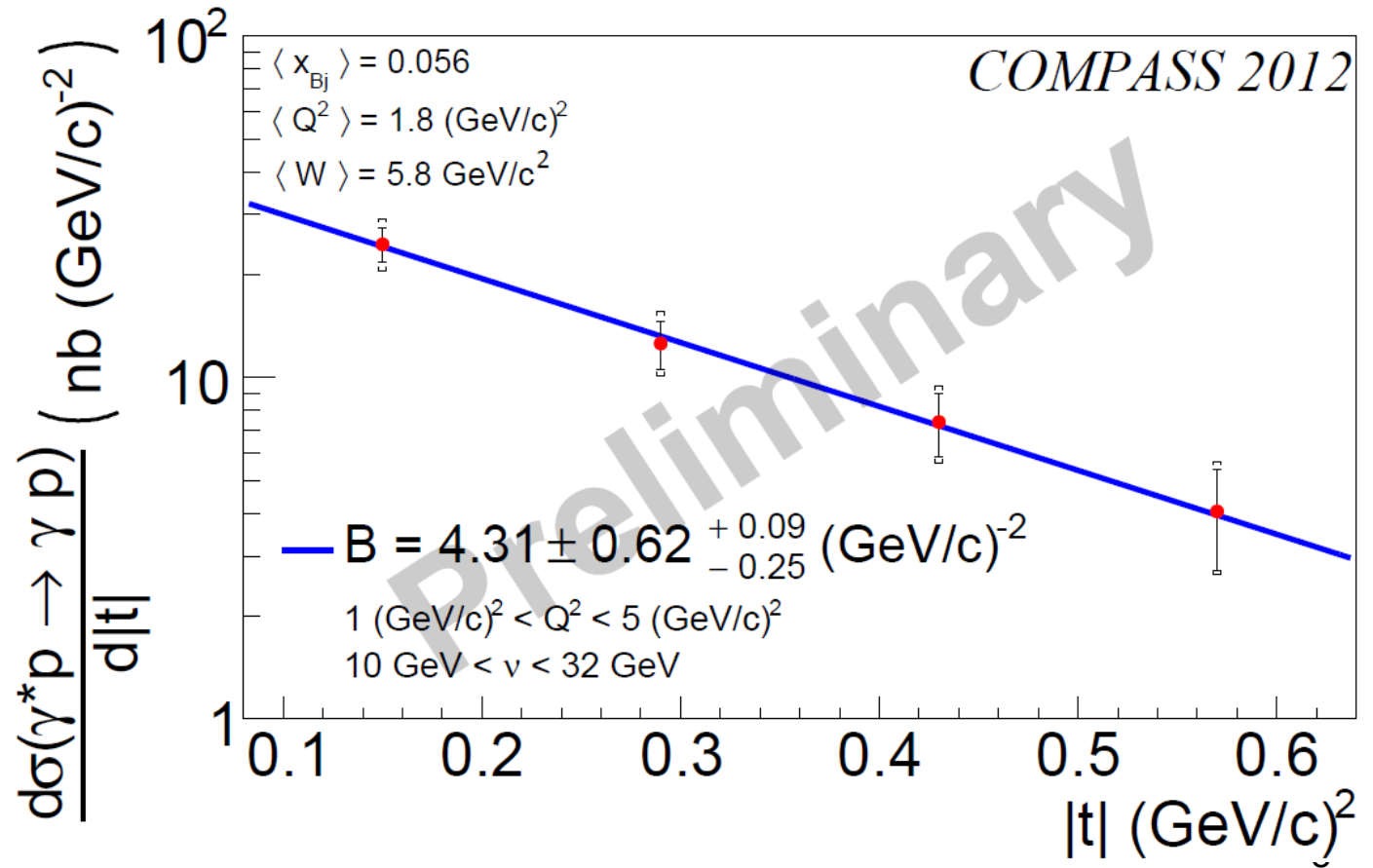
# COMPASS-II GPD



# DVCS断面積測定: COMPASS



- $\mu$ -beam 160 GeV
- Liq. H target
- With recoil proton detection

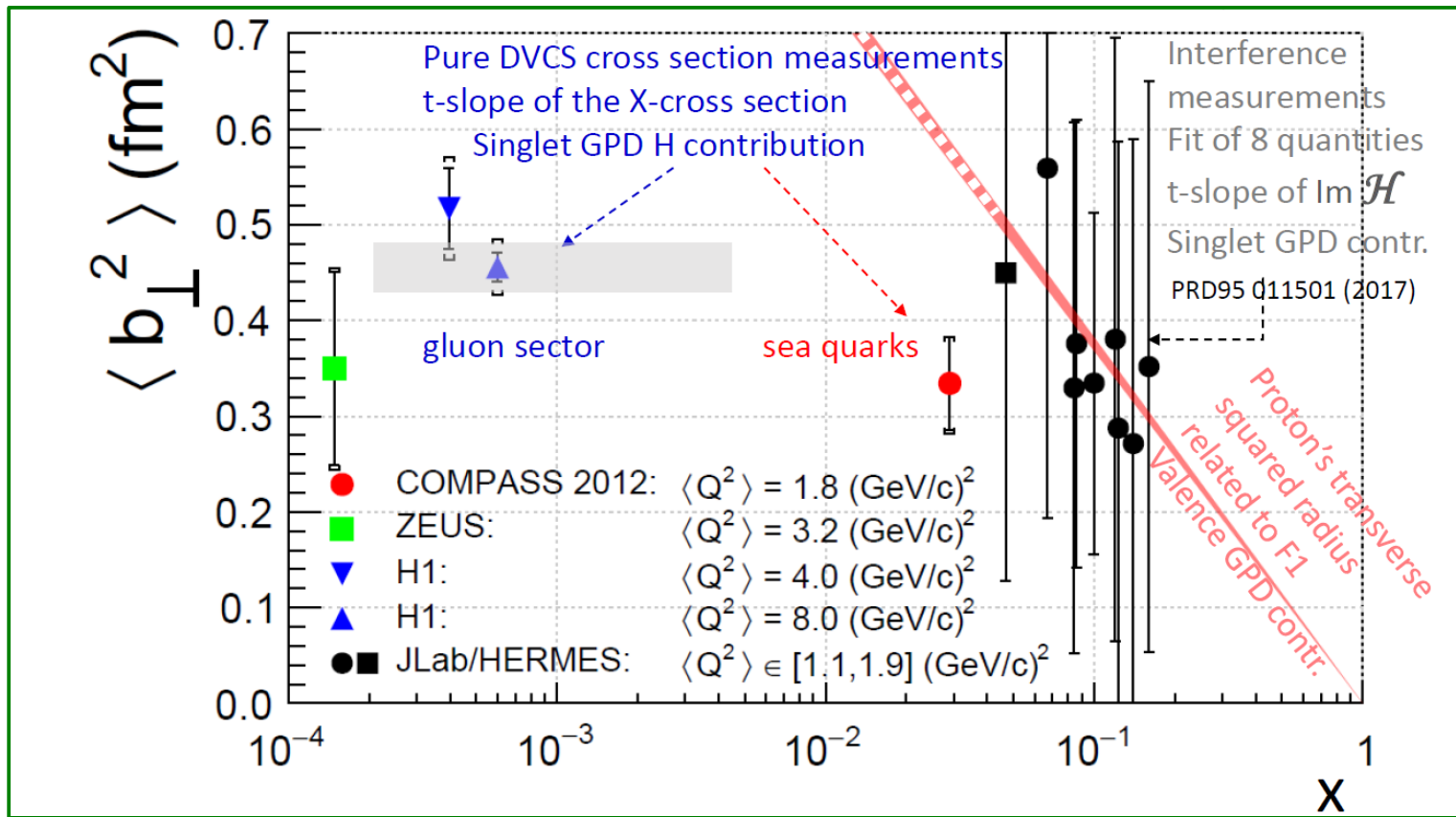
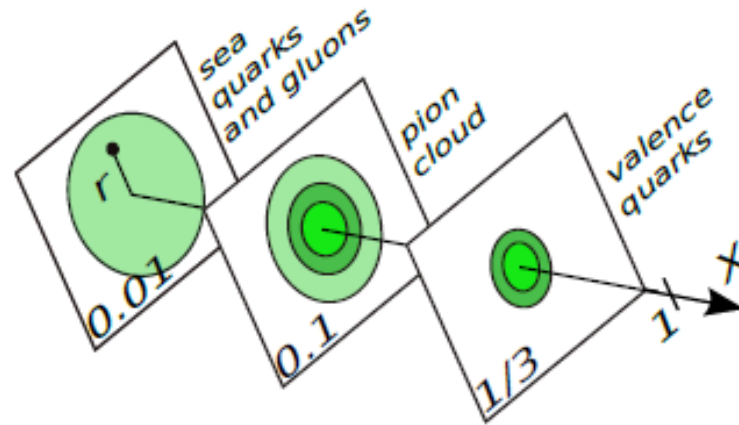






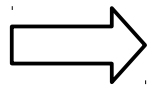
# DVCS断面積 → クォーク運動量・空間分布

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Data taking: ~ 2017



将来計画の方に入れる



# 今後の予定に入れること

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- COMPASS-II の完遂
  - PoIDY 全データによる解析 (+2018年Run)
  - GPDプログラム全データによる解析
- 横偏極重陽子標的を利用した測定 (2019年)
  - 横偏極陽子標的と同等の統計量での測定
  - ⇒ dクォーク TMD の精密化
- COMPASS-III計画
  - 横偏極陽子標的 + 反跳陽子検出器によるGPD-E測定
    - ⇒ Ji和則によるクォーク全角運動量の決定