

DIS2026

# **Some Recaps/Remarks on DIS 2026 talks**

**Taiwan EIC Meeting**

June 18, 2026

Po-Ju Lin

Department of Physics, National Central University

<https://agenda.infn.it/event/47074/>

## Overview

The 33<sup>rd</sup> International Workshop on Deep Inelastic Scattering and Related Subjects (DIS2026) will be held in Bologna, Italy, from May 4 to May 8, 2026.

DIS2026 is the 33<sup>rd</sup> in an annual series of International Workshops covering a broad mixture of material related to Quantum Chromodynamics and Deep Inelastic Scattering as well as a general survey of the hottest topics in high energy physics. A significant part of the program is devoted to the most recent theoretical advances and results from large experiments at BNL, CERN, DESY, FNAL, JLab and KEK.



The Two Towers of Bologna. The iconic medieval landmarks of the city, dating back to the 12th century.



The Two Towers of Bologna. The iconic medieval landmarks of the city, dating back to the 12th century.

## Scientific Programme

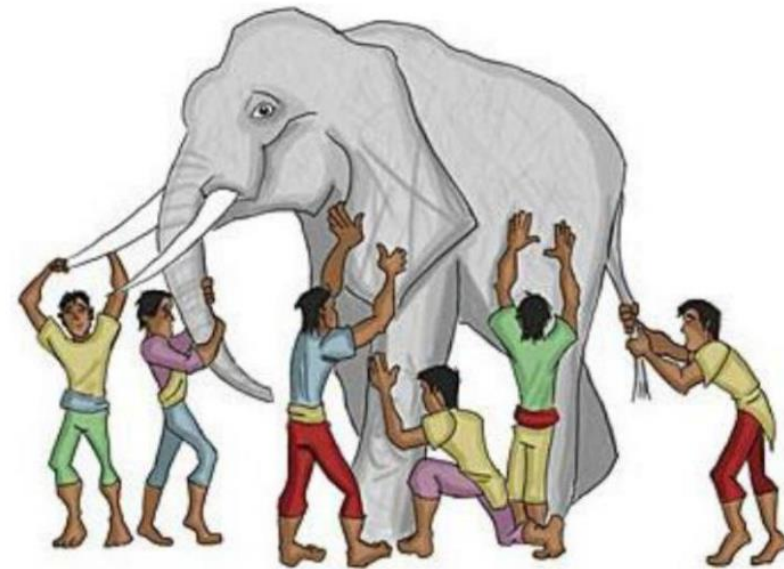
The DIS2026 workshop hosts a number of plenary sessions (Monday and Friday) and parallel sessions (Tuesday to Thursday).

The parallel sessions are organized in 6 working groups

- WG1 Structure Functions and Parton Densities
- WG2 Small-x, Diffraction and Vector Mesons
- WG3 Electroweak Physics and Beyond the Standard Model
- WG4 QCD with Heavy Flavors and Hadronic Final States
- WG5 Spin and 3D Structure**
- WG6 Current Upgrades and Future Experiments

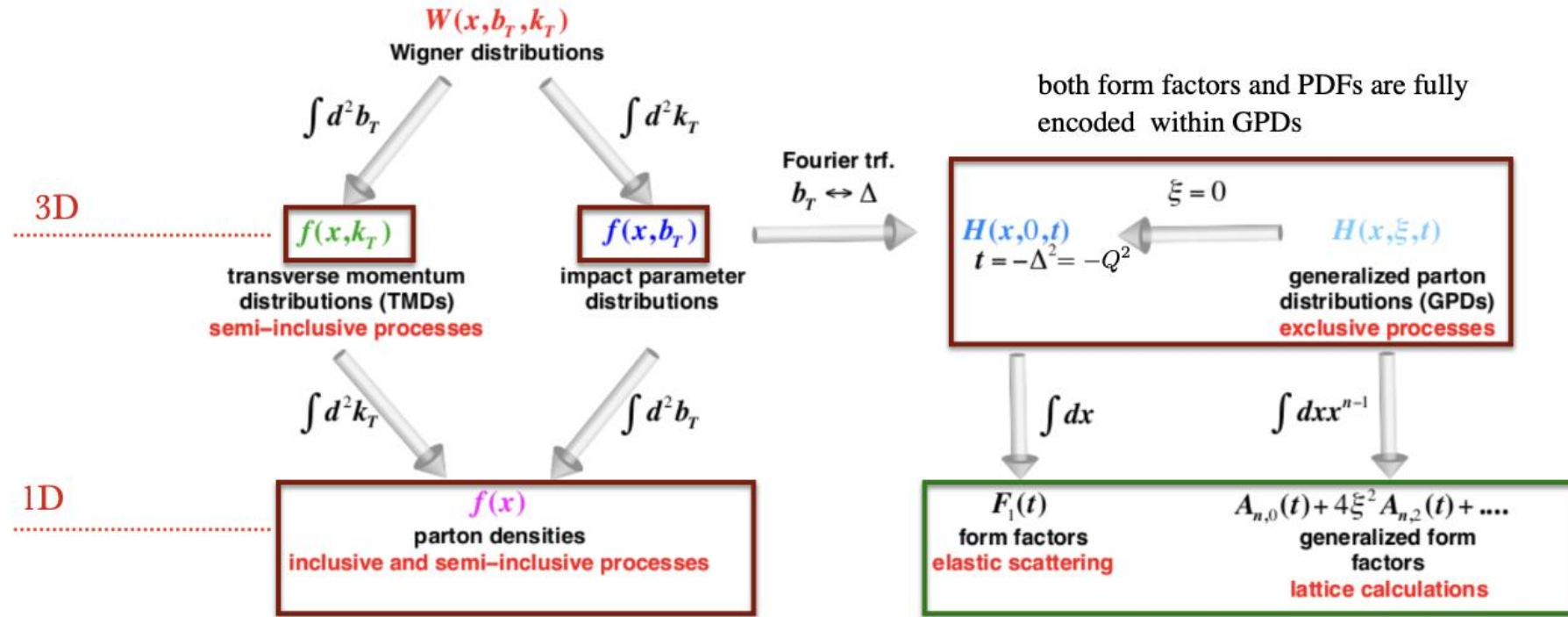
# Disclaimer

- **This is only my personal perspective. There can very likely be misinterpretations, please dig into the talks you find interesting as well 😊**

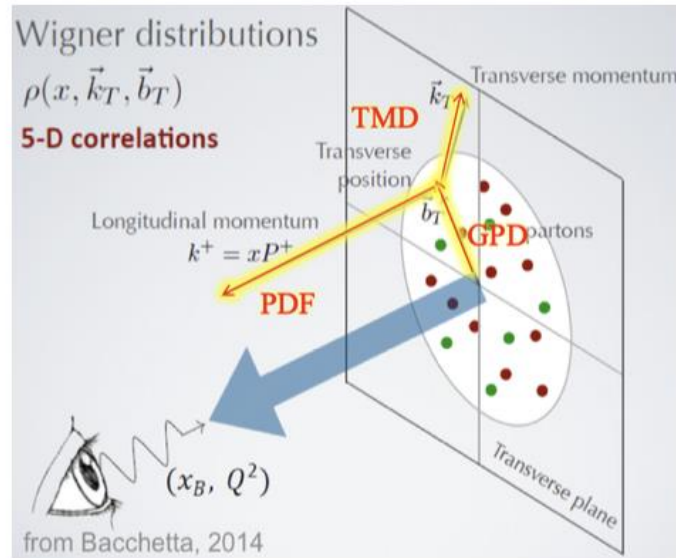


...This is actually stolen from the review talks of WG5.

# Nucleon tomography

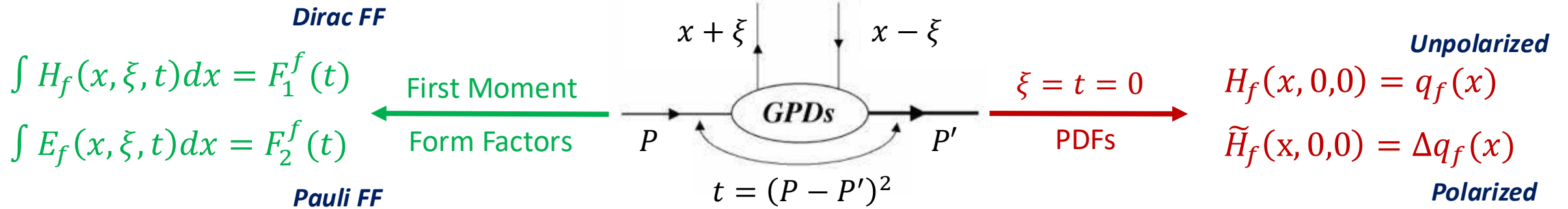


Studies in lattice QCD since the 1990s  
 EIC report: A. Arcardi *et al.* arXiv:1212.1701



- ✳ PDFs : momentum and spin distributions of quarks and gluons.
- ✳ GPDs: correlation between the transverse position and longitudinal momentum of the partons.
- ✳ Transverse Momentum Dependent (TMDs) PDFs: link the longitudinal and transverse momenta of the partons

# GPDs



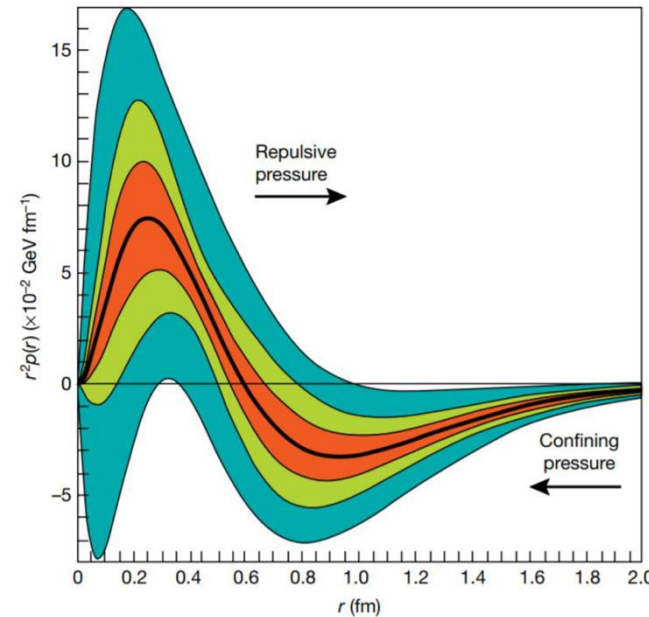
➤ Access the orbital angular momentum of quarks

$$\frac{1}{2} = \frac{1}{2} \Delta \Sigma + L_q + J_g$$

$$J_q = \frac{1}{2} \int_{-1}^1 dx x [H^q(x, \xi, 0) + E^q(x, \xi, 0)]$$

**Ji's Sum Rule**

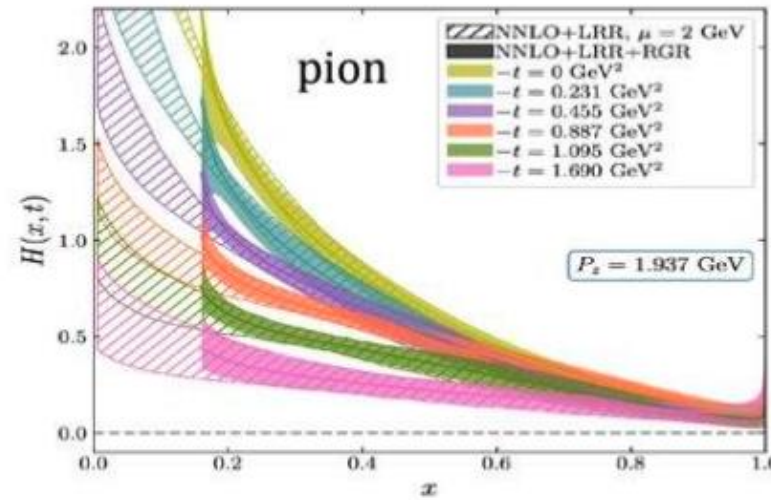
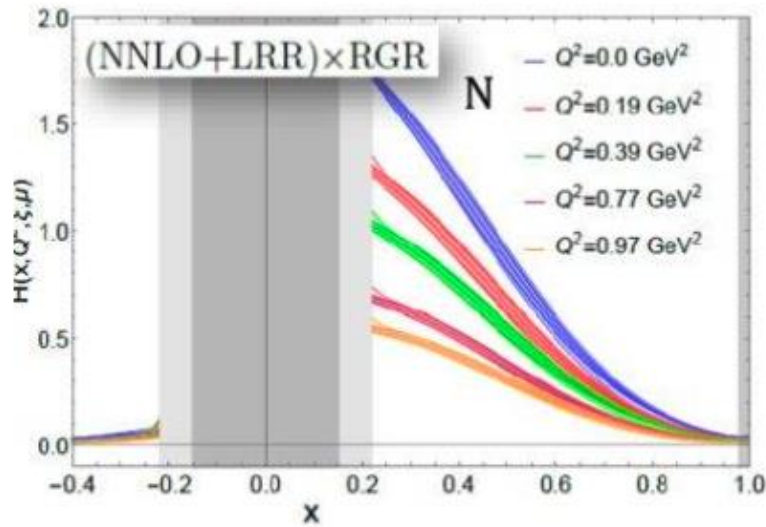
➤ Pressure distribution inside the proton



$$\int x H(x, \xi, t) dx = M_2(t) + \frac{4}{5} \xi^2 d_1(t)$$

$$d_1(t) \propto \int \frac{j_0(r\sqrt{-t})}{2t} p(r) d^3 r$$

$d_1(t)$ : gravitational form factor  
 $p(r)$ : radial pressure distribution



Recent results from Lattice calculations

- x-dependence with Quasi-PDF
- LaMET framework

Study of LaMET limitation:

- Logarithmic divergence
- Limitation of Fourier transformation from finite lattice spacing to map to small  $x$
- Limitation of the idea of LaMET itself: assumes large hadron momentum so quasi-distribution can be matched perturbatively to light-cone distribution.

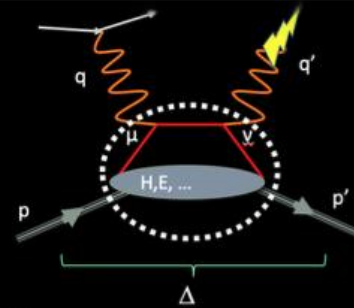
- Power expansion corrections  $\mathcal{O}(\Lambda_{\text{QCD}}^2/(xP_z)^2) \rightarrow$  blows up at small  $x$

- Large- $x \rightarrow$  JLab result comparison, small- $x \rightarrow$  global analysis still, EIC data

## 3.

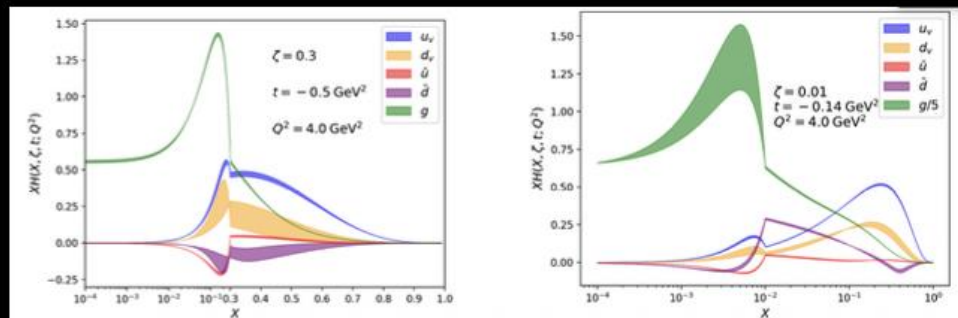
## Inverse problem in GPD fits

$$\text{CFF}(x_{Bj}, t, Q^2) = \int (\text{QCDCKernel}) \times \text{GPD}(x, x_{Bj}, t, Q^2)$$

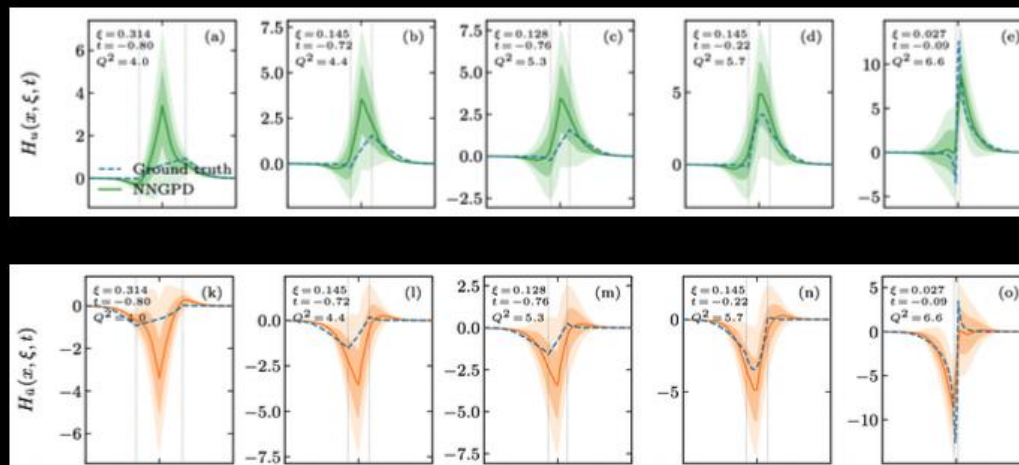


Hessian based fit (Z.Panjsheeri et al.,)

$$\chi_E^2(a, \lambda) = \sum_{k=1}^{N_{pt}} \frac{1}{S_k^2} \left( D_k - T_k(a) - \sum_{\alpha=1}^{N_\lambda} \lambda_\alpha \beta_{k\alpha} \right)^2 + \sum_{\alpha=1}^{N_\lambda} \lambda_\alpha^2$$



NNGPD (Jitao Xu, Jang (Jason) Ho, Zaki Panjsheeri et al)



# GPDs : Theory

Simonetta Liuti

Neural Network Representation of Generalized Parton Distributions (NNGPD)

<https://agenda.infn.it/event/47074/contributions/289166/>

## Mellin Moments Loss

$n=2,4,6,\dots$

$n=1,3,5,\dots$

$$\mathcal{L}_{\text{MM}}^- = \sum_{n=2, \text{even}}^{N_M-1} \sum_m \left| M_n^q(t_m, \xi_m, Q_m^2) - \int_{-1}^1 dx x^{n-1} \hat{F}_q(x, \xi_m, t_m; Q_m^2) \right|^2$$

$$\mathcal{L}_{\text{MM}}^+ = \sum_{n=1, \text{odd}}^{N_M} \sum_m \left| M_n^q(t_m, \xi_m, Q_m^2) - \int_{-1}^1 dx x^{n-1} \hat{F}_q(x, \xi_m, t_m; Q_m^2) \right|^2$$

$M_n$

$$\int_{-1}^1 dx x^{n-1} H_q(x, \xi, t) = \sum_{i=0, \text{even}}^{n-1} (2\xi)^i A_{n,i}^q(t) \quad (8)$$

$$\int_{-1}^1 dx x^{n-1} E_q(x, \xi, t) = \sum_{i=0, \text{even}}^{n-1} (2\xi)^i B_{n,i}^q(t) \quad (9)$$

$n=1$

$$\int_{-1}^1 dx H^q(x, \xi, t) = F_1^q(t),$$

$$\int_{-1}^1 dx E^q(x, \xi, t) = F_2^q(t),$$

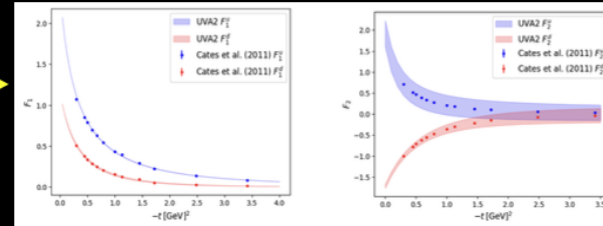
$n=2$

$$\int_{-1}^1 dx x H^q(x, \xi, t) = A_q(t) + (2\xi)^2 C_q(t),$$

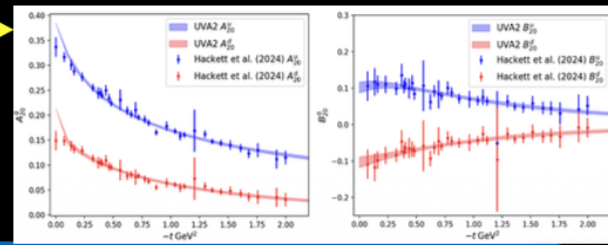
$$\int_{-1}^1 dx x E^q(x, \xi, t) = B_q(t) - (2\xi)^2 C_q(t),$$

fitting more moments from LQCD, up to  $n=6$  (Bhattacharia et al.)

Experiment



LQCD



Panjsheeri et al. [arXiv:2511.03065v2 [hep-ph]]

- Other Loss functions involve symmetry, Compton Form Factors...
- Use inputs from experimental data and LQCD.
- Closure test using pseudo-data generated from phenomenological model → NNGPD reproduces the main feature of underlying model GPD over a broad kinematic domain.
- NN framework differs from conventional phenomenological parametrizations, which introduces model dependence assumptions. NN framework is agnostic about detailed functional structure of GPDs.

$$M_n = \int x^{n-1} \times GPD$$

angular momentum, calculable in lattice QCD

$$CFF = \int (\text{QCDKernel}) \times GPD$$

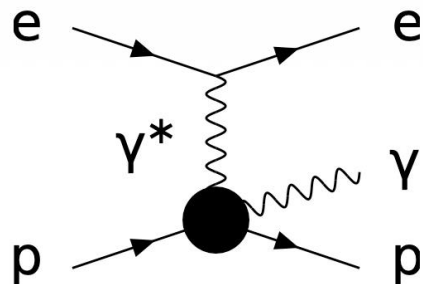
experimental observable

GPD

Is knowing the x dependence crucial?

- It is needed to test the partonic property and to do images.
- For the problem of extracting OAM from data we might not need a full x-coverage: going from CFFs to Mellin moments directly
- End to End → predict Moments from CFF, knowing the extent to which information on angular momentum is in the data
- This technique applies to other extractions: tensor charge and BSM studies

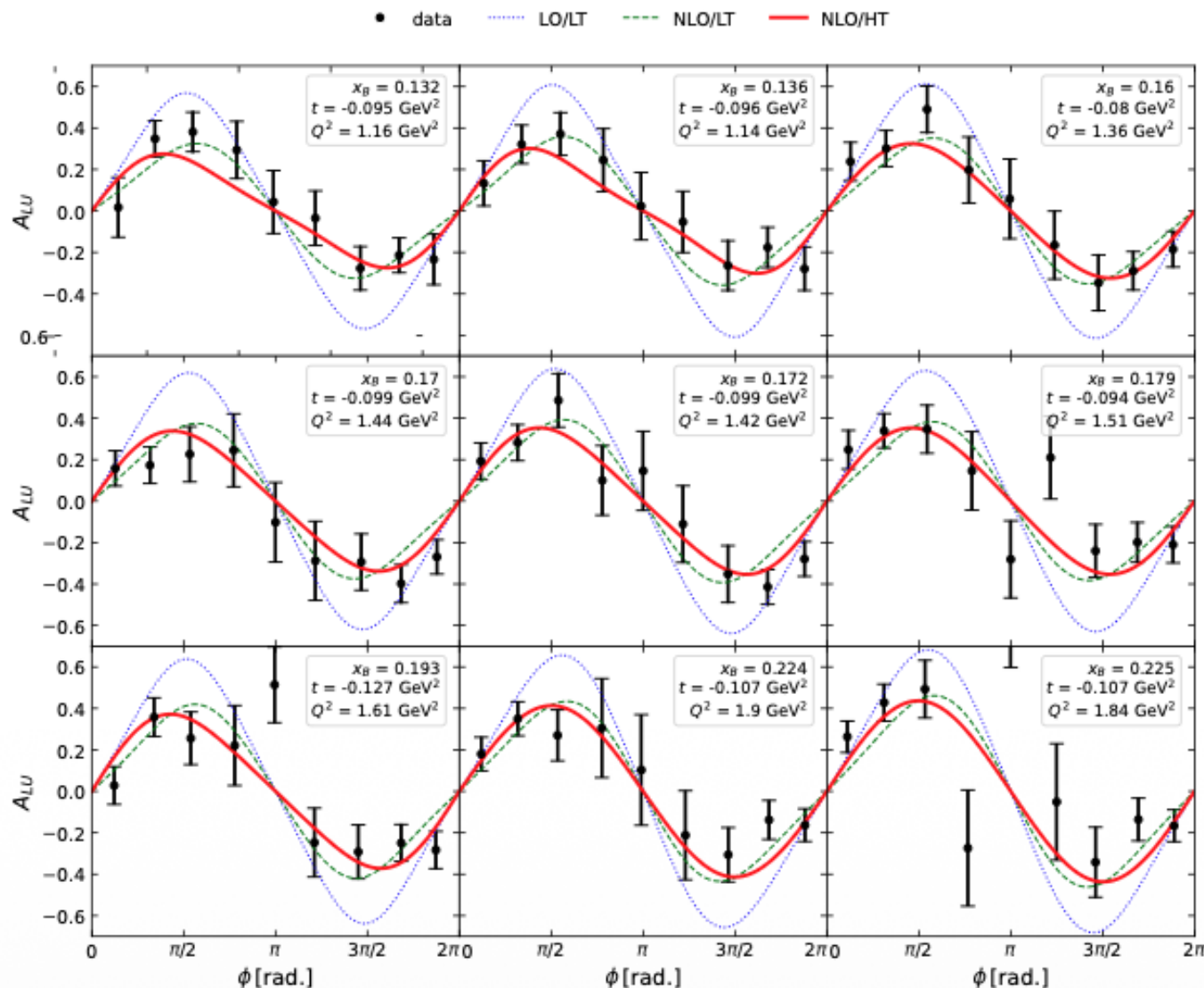
## DVCS and GPDs

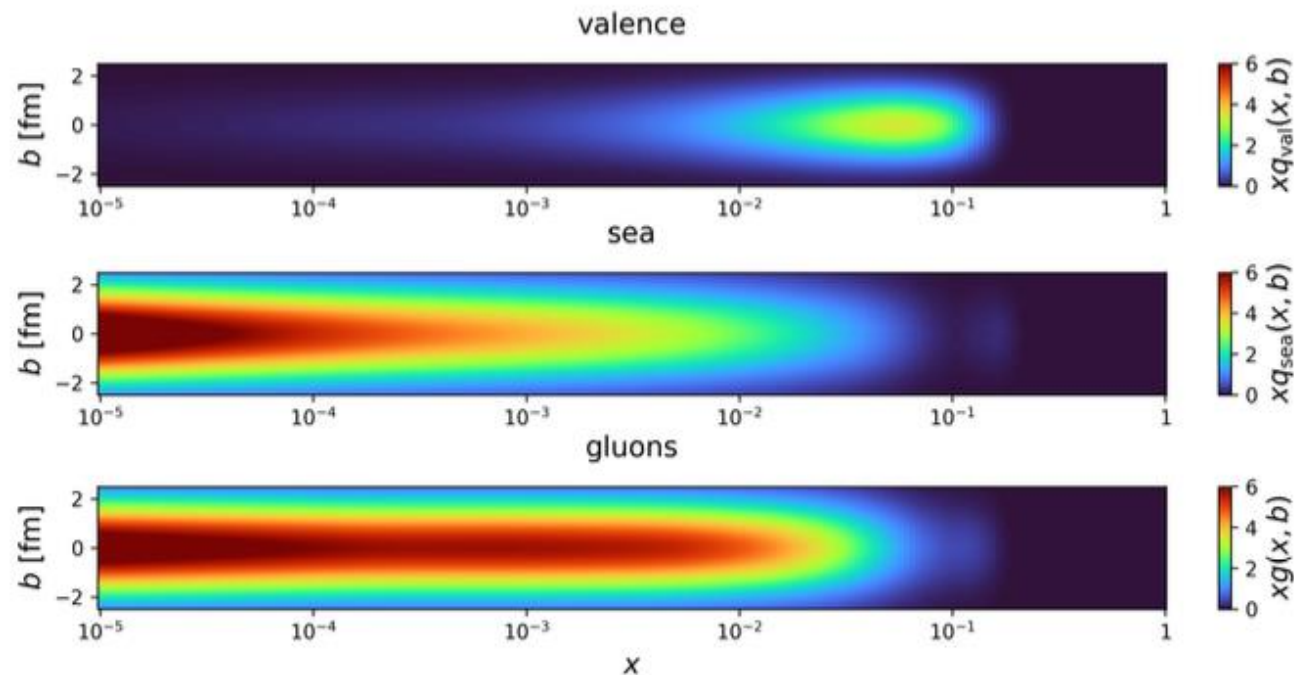
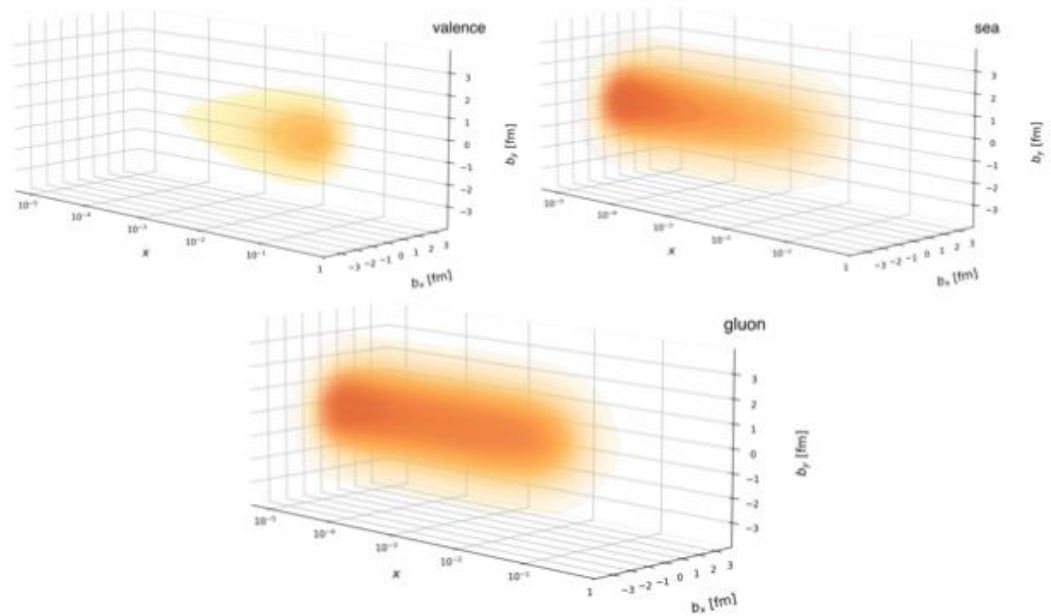


Factorization into **GPDs** and perturbative coefficient function - on the level of **amplitude**.

## DVCS on Helium-4 with high precision Why helium-4?

- ▶ provides access to the quark-gluon structure of light nuclei. Important nuclear modification effects;
- ▶ existing JLab6 data, with more data expected from JLab12;
- ▶ only one GPD at LO/LT, with one additional contribution entering at NLO;
- ▶ isospin symmetry helps reduce the number of model parameters;





Tomographic pictures of  $^4\text{He}$  nuclei,  $xq(x, b_x, b_y)$  and  $xg(x, b_x, b_y)$ . The valence distribution indicates contributions coming from both up and down quarks, while the sea distribution includes contributions from up, down and strange quarks and antiquarks.

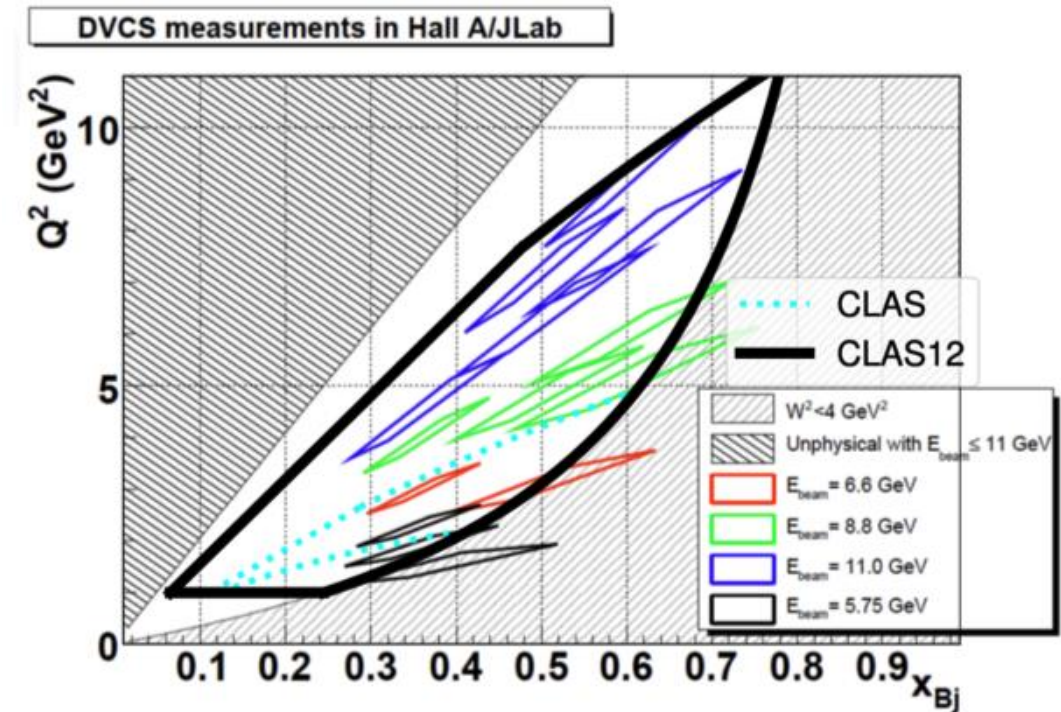
- ▶ First GPD fit based on kinematic HT and NLO (also with full GPD evolution)
- ▶ First helium tomography
- ▶ Outlook: TCS and other exclusive processes on helium
- ▶ Outlook: Same precision needed for DVCS on nucleons

- GPDs embedded in Compton Form Factors (CFFs):

$$\mathcal{F}(\xi, t) = \mathcal{P} \int_{-1}^1 dx F(x, \xi, t) \left( \frac{1}{x - \xi} \mp \frac{1}{x + \xi} \right) - i\pi \left[ F(\xi, \xi, t) \mp F(-\xi, \xi, t) \right]$$

## DVCS: $ep \rightarrow e'p'\gamma$

- Measured previously at JLAB by Hall A and CLAS6; **CLAS12 significantly extends coverage** in the valence region
- [publication pending] S. Lee *et al.* : first CLAS12 extraction of unpolarized DVCS cross section using a 10.6 GeV longitudinally polarized beam incident on a hydrogen target ( $Q_{tot} \approx 99mC$ )
- [in-progress] multi-pronged analysis underway for complementary data sets (more stats!) at different beam energies:
  - 6.4 GeV (90mC), 6.5 GeV (10mC), 7.5 GeV (10mC), and 8.4 GeV (80mC)
  - Rosenbluth separation anticipated for model-independent extraction of  $Re(\mathcal{H})$



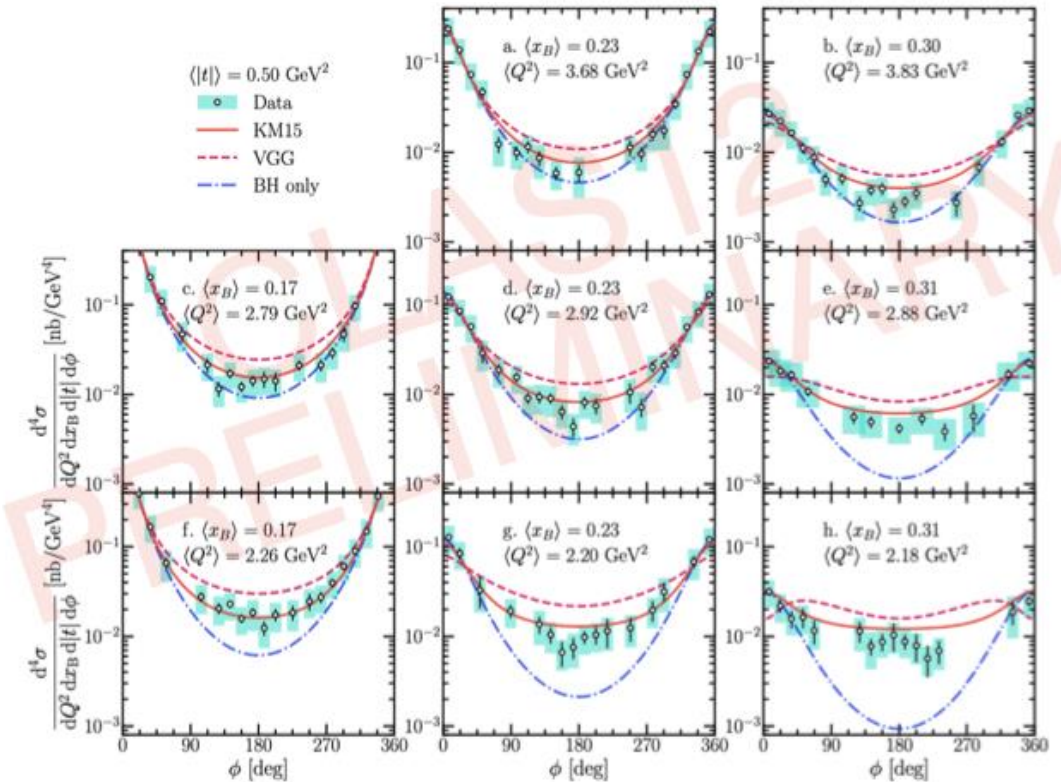
Cyan boundary from CLAS6; black boundary from CLAS12; Parallelograms from Hall A

- GPDs embedded in Compton Form Factors (CFFs):

$$\mathcal{F}(\xi, t) = \mathcal{P} \int_{-1}^1 dx F(x, \xi, t) \left( \frac{1}{x - \xi} \mp \frac{1}{x + \xi} \right) - i\pi \left[ F(\xi, \xi, t) \mp F(-\xi, \xi, t) \right]$$

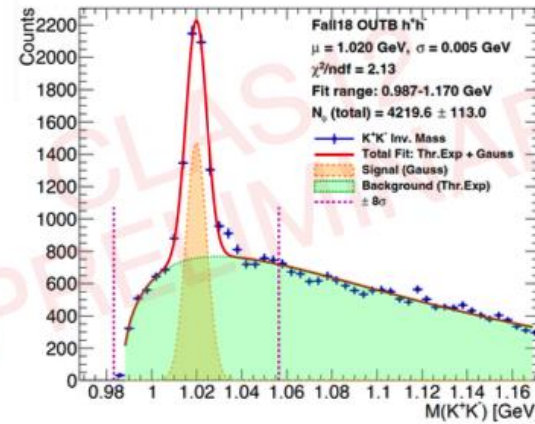
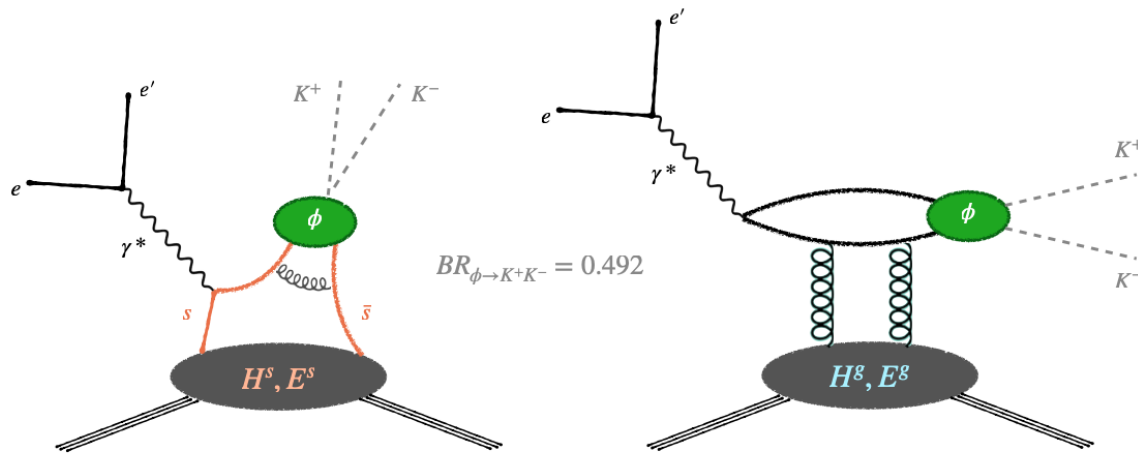
## DVCS: $ep \rightarrow e'p'\gamma$

- Measured previously at JLAB by Hall A and CLAS6; **CLAS12 significantly extends coverage** in the valence region
- [publication pending] *S. Lee et al.* : first CLAS12 extraction of unpolarized DVCS cross section using a 10.6 GeV longitudinally polarized beam incident on a hydrogen target ( $Q_{tot} \approx 99mC$ )
- [in-progress] multi-pronged analysis underway for complementary data sets (more stats!) at different beam energies:
  - 6.4 GeV (90mC)**, **6.5 GeV (10mC)**, **7.5 GeV (10mC)**, and **8.4 GeV (80mC)**
- Rosenbluth separation anticipated for model-independent extraction of  $Re(\mathcal{H})$

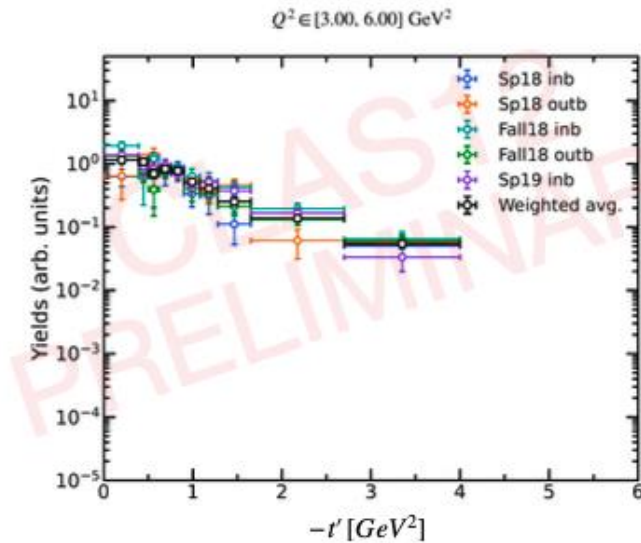


*S. Lee et al.* : extracted unpolarized  $d^4\sigma$  values vs.  $\phi$ , alongside predictions from **BH-only**, **KM15**, and **VGG** models

## $\phi$ Production (DV $\phi$ P): $ep \rightarrow e'p'\phi \rightarrow e'p'K^+K^-$



Inv. mass of  $K^+, K^-$  shows signature of  $\phi(1.019 \text{ GeV})$

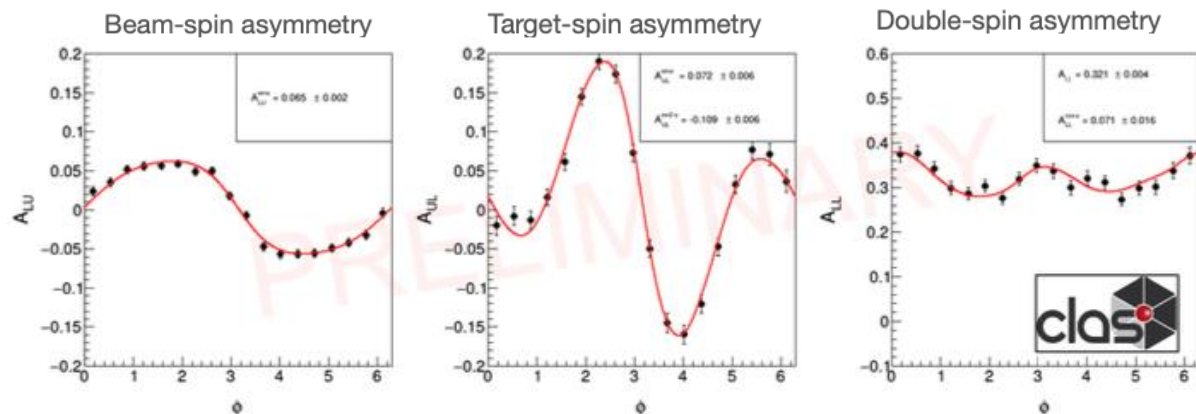


- OZI suppression of light-quark contributions isolates **strangeness GPDs** at moderate  $x$  and simplifies separability from **gluon GPDs** as  $x$  decreases
- Cross section's  $|t|$  - slope probes transverse spatial profile; evolution with  $Q^2$  sensitive to onset of gluon dominance – asymptotic limit yields **gluonic radius**
- Cross section near threshold sensitive to **intrinsic strangeness**

## $\pi^+(\pi^-)$ Production (DV $\pi$ P): $ep(n) \rightarrow e'n\pi^+(p\pi^-)$

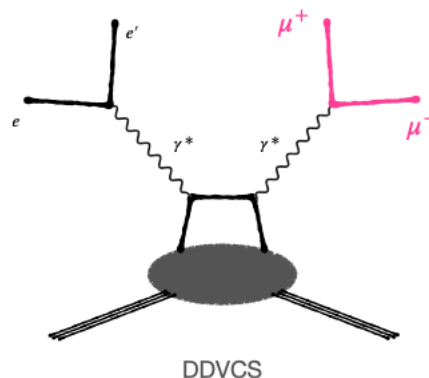
using longitudinally-polarized nuclear targets  $NH(D)_3$  (data from '22, '23)

- Longitudinal beam + longitudinal target unlocks  $A_{LU}, A_{UL}, A_{LL}$  — **5+ modulations**
- Interference of polarization states (LT and TT) accesses **chiral-odd sector**
- Probes axial, long-range structure (pion cloud) and **isospin dependence**



## Double DVCS $\mu$ CLAS12

- Generalizes DVCS and TCS and enables access to CFFs at  $x \neq \pm \xi$
- Di-muon final state requires adjustments to detector, e.g. shielding, tracking
- Luminosity boost  $L \sim 10^{37} \text{cm}^{-2} \text{s}^{-1}$  to offset suppression  $\frac{\sigma_{DDVCS}}{\sigma_{DVCS}} \sim 10^{-3}$
- Approved by 2025 JLAB Program Advisory Committee

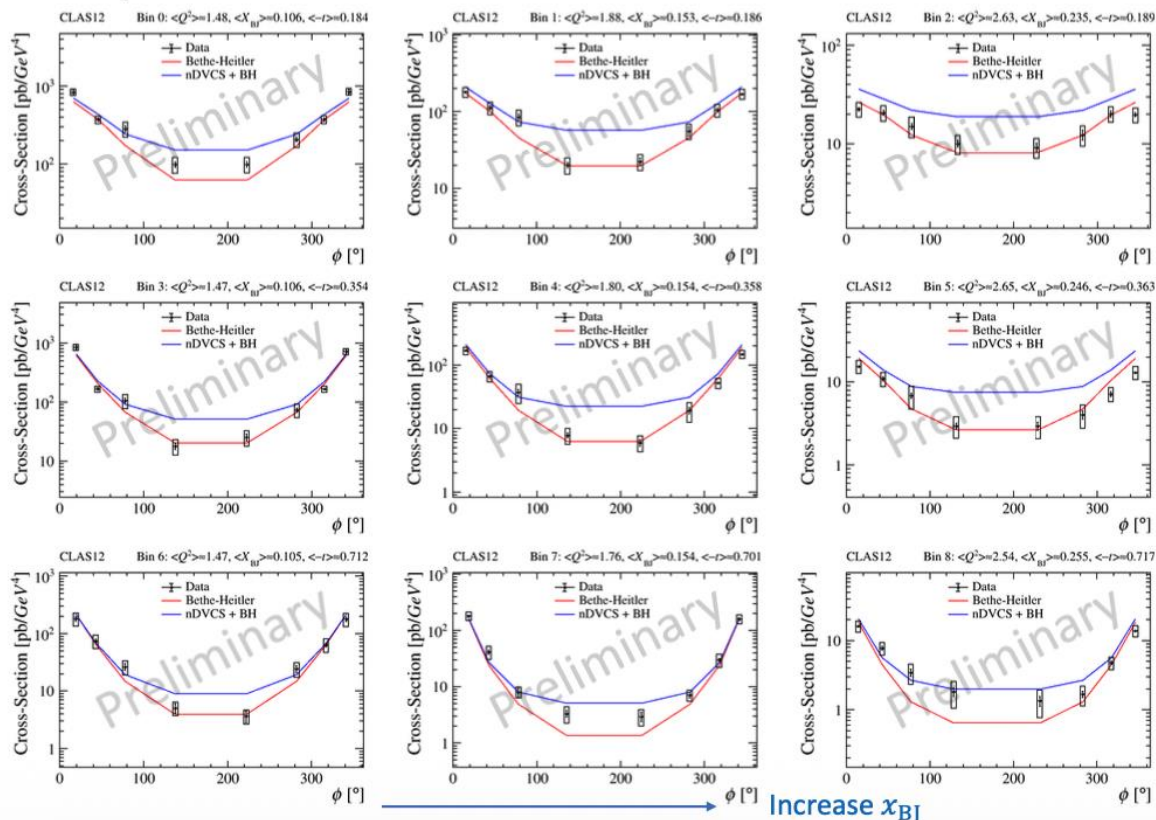


## Run Group H: A Transversely Polarized Target

- DVCS Proposal **C12-12-010**: first multidimensional extraction of **transverse TSA to access E, the least constrained GPD** which characterizes orbital angular momentum, spin-orbit correlations

- The measurement of DVCS cross section from the neutron (nDVCS) can provide unique information on GPDs
  - GPD  $E$  is largely unknown so far
  - The unpolarized cross section of nDVCS is sensitive mainly to the real CFF of  $E$
  - The polarized cross-section difference of nDVCS is sensitive to the imaginary CFF of  $E$

## Unpolarized cross section



- Linked mainly to the real CFF of GPD  $E$
- Error bars: statistical  
Boxes: systematic
- The data are compatible with the BH calculations at  $\phi$  edges
- nDVCS+BH predictions: VGG model with  $J_u = 0.3$  and  $J_d = 0.1$
- Predictions overshoot the data in the central- $\phi$  region, indicating the real CFF of  $E$  is not correctly parametrized in the VGG model

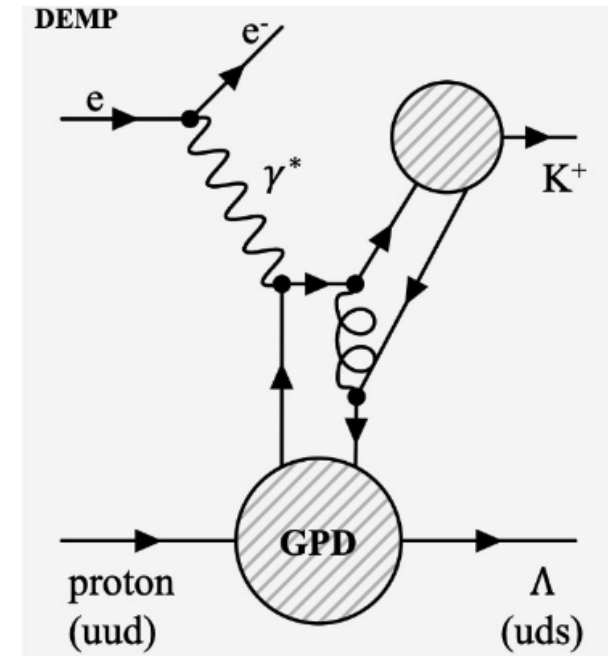
# $\Lambda$ polarization in $K^+ \Lambda$ electroproduction

- Motivation

- Probe chiral-odd GPD
  - Difficult to access (helicity flip processes are suppressed)
  - $\Lambda$  polarization is a sensitive probe for the chiral-odd GPD
- Probe the origin of  $\Lambda$  transverse polarization
  - $\Lambda$  polarization puzzle: unexpected transverse  $\Lambda$  polarization in unpolarized collisions ( $pp$ ,  $ep$ , etc.)
  - Key question: the underlying mechanism of  $\Lambda$  polarization

- Approach

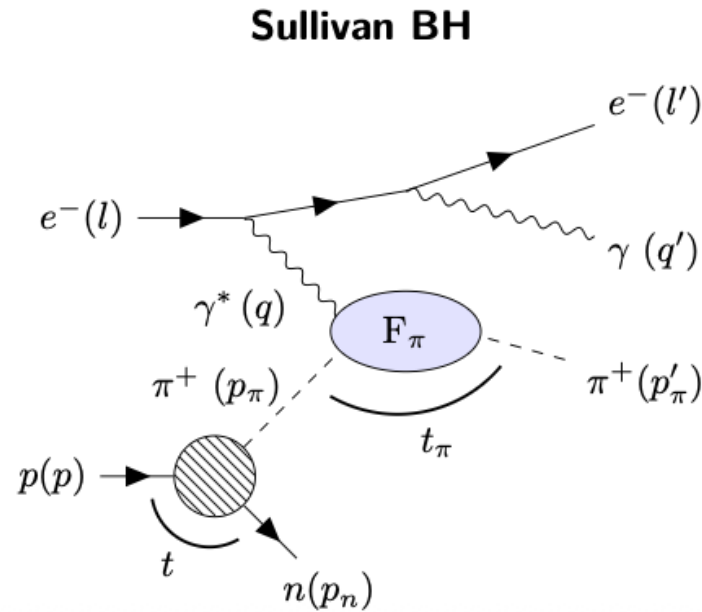
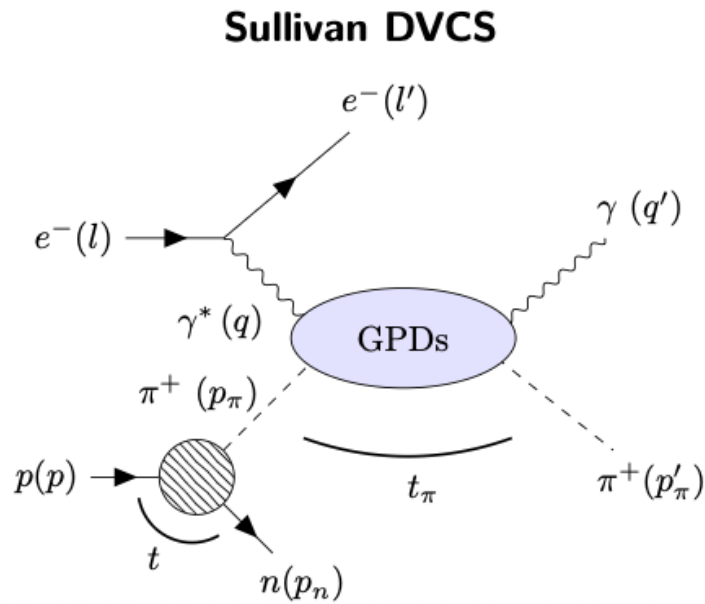
- $ep \rightarrow eK^+ \Lambda$  with longitudinally polarized target
  - $\Lambda \rightarrow p\pi^-$ : Self-analyzing weak decay
  - Exclusive process: Simplify the picture of  $\Lambda$  polarization
    - No fragmentation, no feed-down
  - Polarized target: Study the spin transfer from the target



[PhysRevC.109.055205](https://arxiv.org/abs/1005.2205)

## Sullivan DVCS to access pion GPDs

Cross section DVCS+BH  $d\sigma = |T_{BH}|^2 + |T_{DVCS}|^2 + \mathcal{I}_{unpol} + \lambda_e \mathcal{I}_{pol}$  [3]



Compton Form Factor (CFF) at leading order:

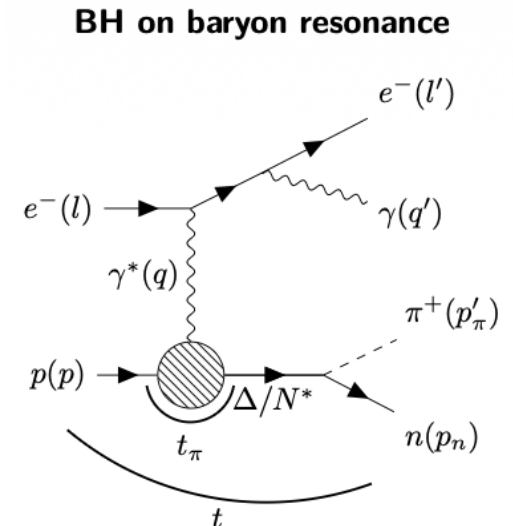
$$\mathcal{H}_\pi(\xi, t, Q^2) = \sum_q e_q^2 \int_{-1}^1 dx \underbrace{\left( \frac{1}{x - \xi + i\epsilon} - \frac{1}{x + \xi - i\epsilon} \right)}_{\text{hard scattering}} \underbrace{H_\pi^q(x, \xi, t)}_{\text{pion GPDs}}$$

Observable: Beam-Spin Asymmetry

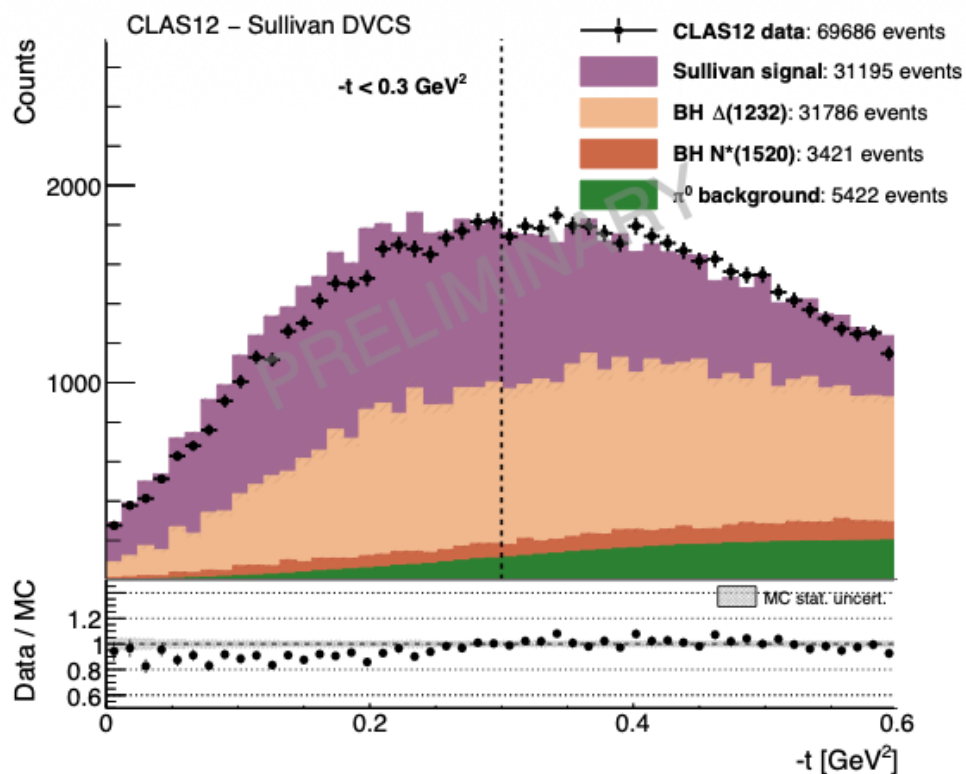
$$A_{LU}(\phi) = \frac{1}{P_b} \frac{N^+(\phi) - N^-(\phi)}{N^+(\phi) + N^-(\phi)} \propto \Im m(\mathcal{H}_\pi) \sin \phi$$

Beam polarization about 86%

- Irreducible background: baryon resonance transition, model estimation crucial for pion GPD extraction.



## Cut on the pion virtuality $-t$



- $-t = -(p - p_n)^2$ .

- $-t < 0.3 \text{ GeV}^2$ .

- Region where:

- Sullivan process is expected to dominate,
- interpretation in terms of pion GPDs is valid.

➤ Additional cut on the pion-photon invariant mass.

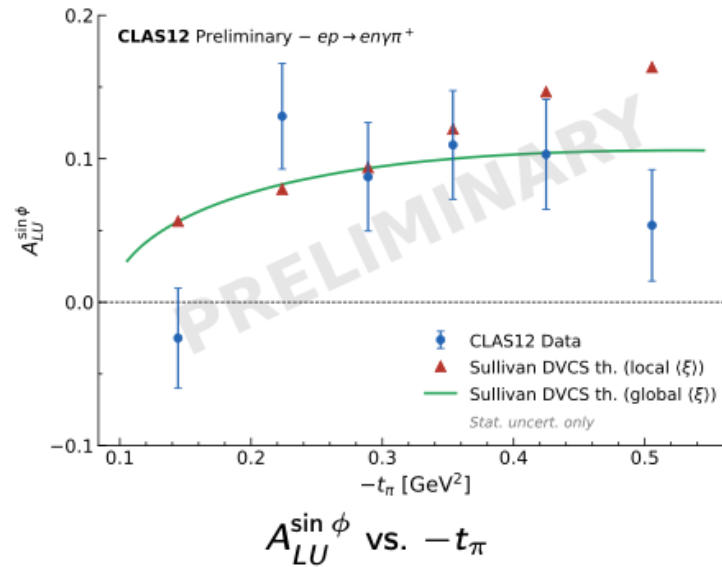
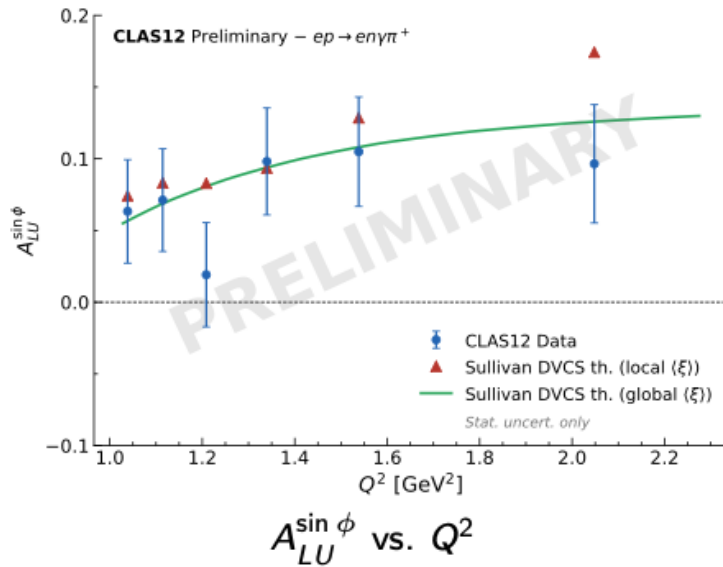
- $s_\pi = (p_\pi + q')^2$ .

- $s_\pi > 1.08 \text{ GeV}^2$ .

- Removes  $\rho^+$ .

Spectrum of the pion virtuality  $-t$  after the cut on  $s_\pi$ .

## Preliminary results for $A_{LU}^{\sin\phi}$



### Next steps:

- Obtain asymmetry predictions for each resonant channel.
- Evaluate systematic uncertainties.
- ⇒ Extract pion GPDs via the yield decomposition.

- The total amplitude can be expressed as a weighted sum of the individual contributions:

$$A_{LU, \text{Total}}^{\sin\phi} = \sum_i w_i A_{LU, i}^{\sin\phi} \implies A_{LU, \text{Sulli}}^{\sin\phi} = \frac{1}{w_{\text{Sulli}}} \left( A_{LU, \text{Total}}^{\sin\phi, \text{data}} - \sum_{i \neq \text{Sulli}} w_i A_{LU, i}^{\sin\phi} \right)$$

where  $i$  runs over the different contributions and  $w_i$  are the corresponding yield fractions.



Predictions of  $A_{LU}^{\sin\phi}$  for each resonance contribution are required to isolate the pion GPD signal.

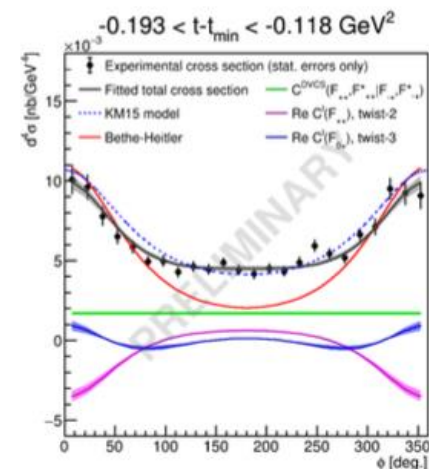
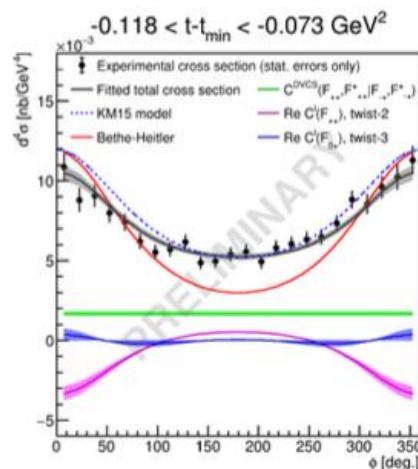
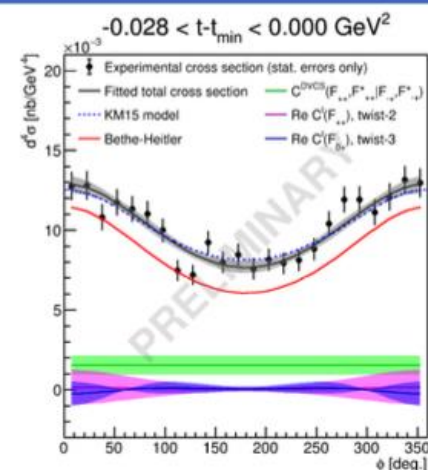
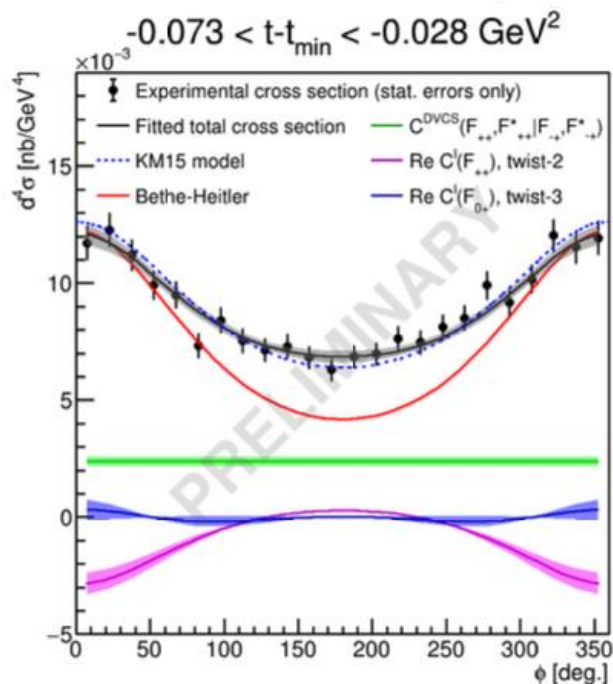
➤ Kinematics:  $\langle Q^2 \rangle = 4 \text{ GeV}^2$ ,  $\langle x_{Bj} \rangle = 0.36$ ,  $E_{\text{beam}} = 10.54 \text{ GeV}$

➤ 5 bins of  $t-t_{\text{min}}$  between 0 and  $-0.35 \text{ GeV}^2$  ( $M_x^2$  cut: 0 to  $1 \text{ GeV}^2$ )

## Preliminary cross section (helicity independent)



- Only the statistical errors included
- Systematic uncertainties are under evaluation
- Good agreement with the KM15 model: parametrization of CFFs fitted to previous DVCS data



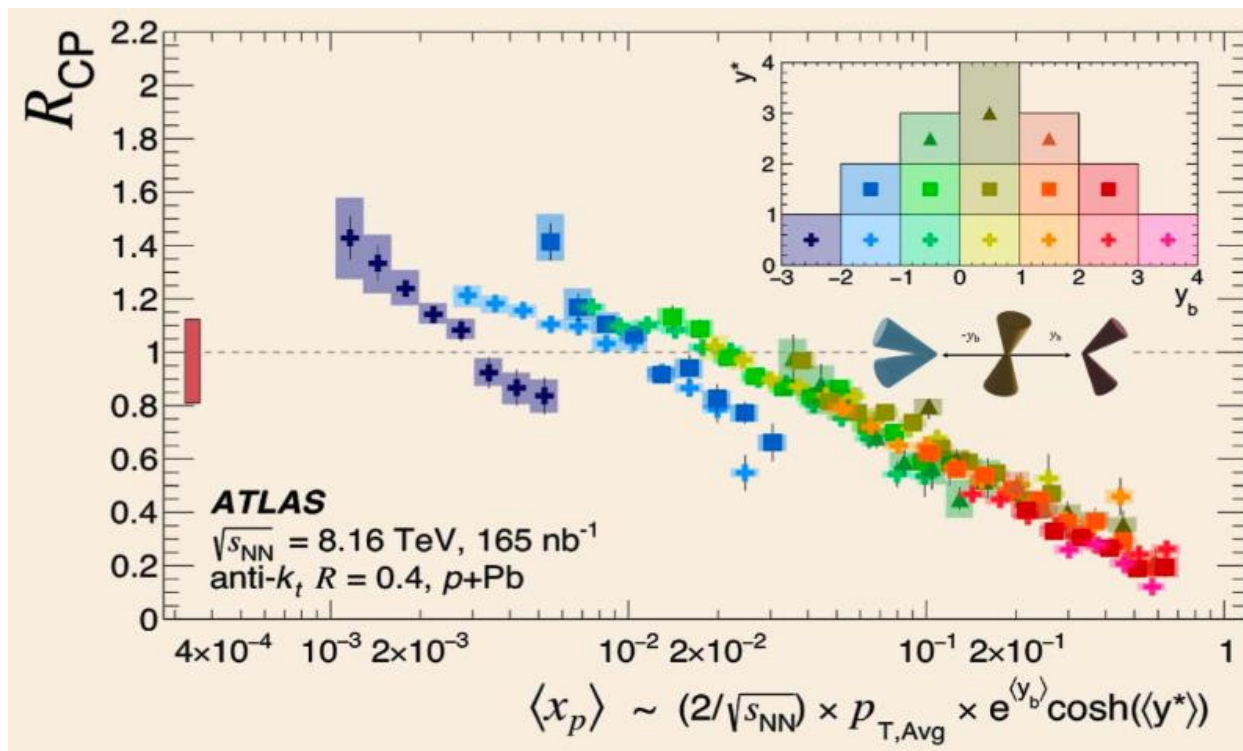
ATLAS HI program includes study of IS effects, particularly in p+Pb collisions, where FS effects are minimal

Role of proton configuration is critical for a correct interpretation of p+Pb data differentiated as function of event geometry

Dijet events provide full access to initial state kinematics

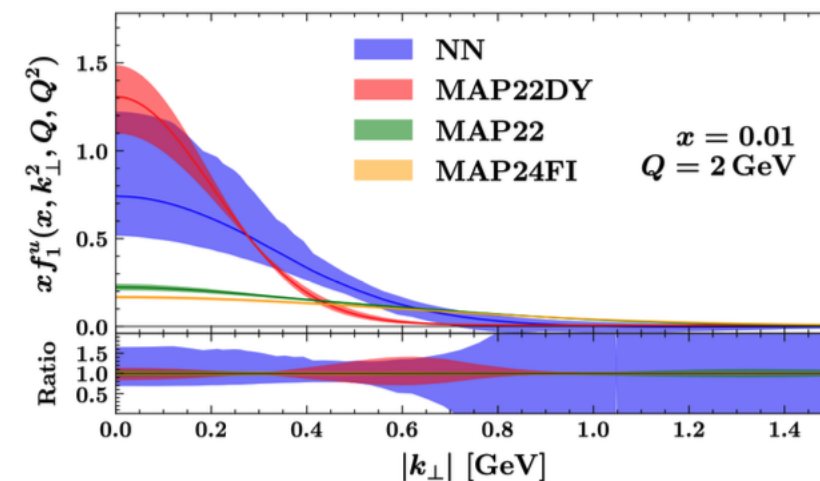
## RCP (central-to-peripheral ratio)

- IS effects in p+A system arise from event-by-event variations in proton transversal size, expected from compact proton configurations at large  $x_p$ , as expected by both color fluctuation phenomenology and GPDs

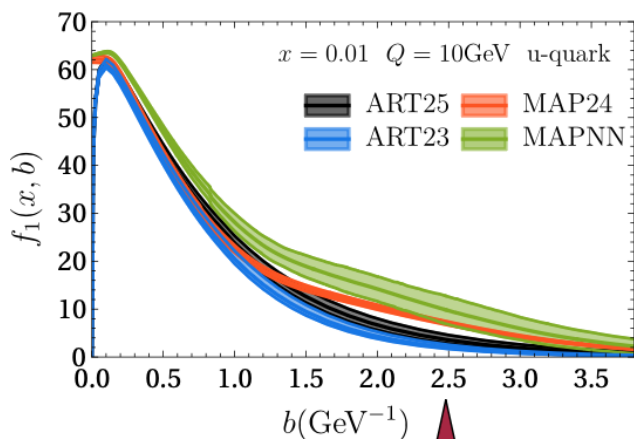


- ▶ MAP24: extraction of unpolarized TMDs with flavor dependence ([arXiv:2405.13833](https://arxiv.org/abs/2405.13833))
- ▶ MAPTMDPion25: extraction of pion TMDs ([arXiv:2509.25098](https://arxiv.org/abs/2509.25098))
- ▶ MAPTMDNN: proof-of-concept extraction of unpolarized TMDs with NN ([arXiv:2502.04166](https://arxiv.org/abs/2502.04166))
- ▶ MAPTMDpol: extraction of helicity TMDs ([arXiv:2409.18078](https://arxiv.org/abs/2409.18078))

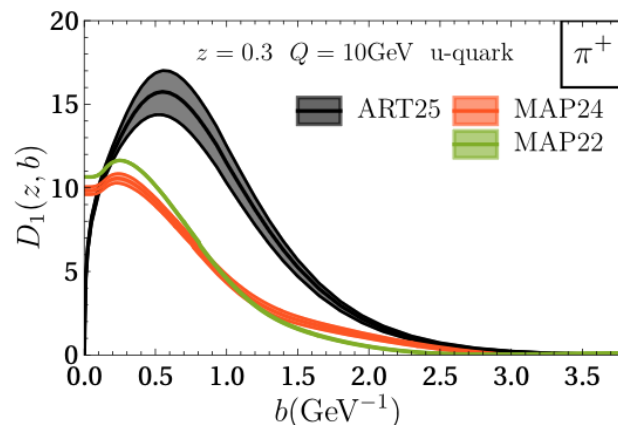
- N3LL fit of unpol TMDs. Flavor-dep TMD PDFs gives better description to data



comparison in  $b_T$  space



There are significant differences between different extractions.  
The error bands are probably underestimated



Even larger differences in the Fragmentation Functions

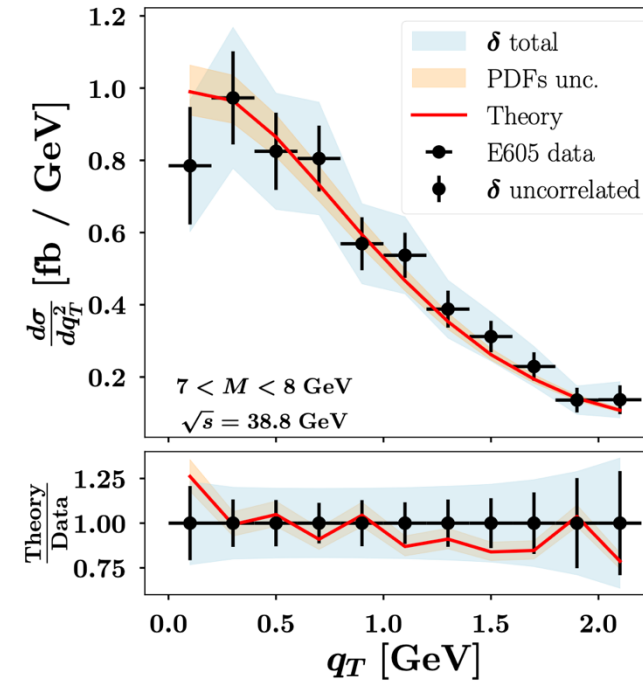
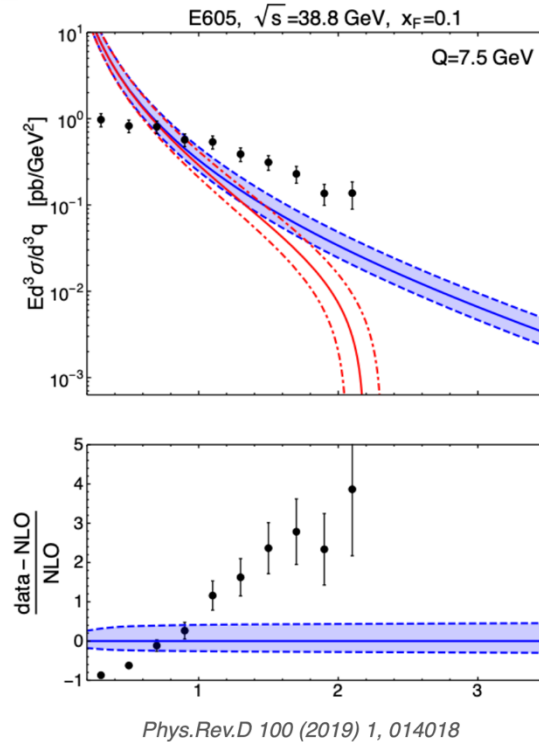
- Comparison with ART25

# TMDs & Others: Theory

Lorenzo Rossi

Low-invariant-mass Drell–Yan transverse-momentum spectra:  
resummation and non-perturbative effects

<https://agenda.infn.it/event/47074/contributions/289152/>



**Starting point**



**Arrival point**

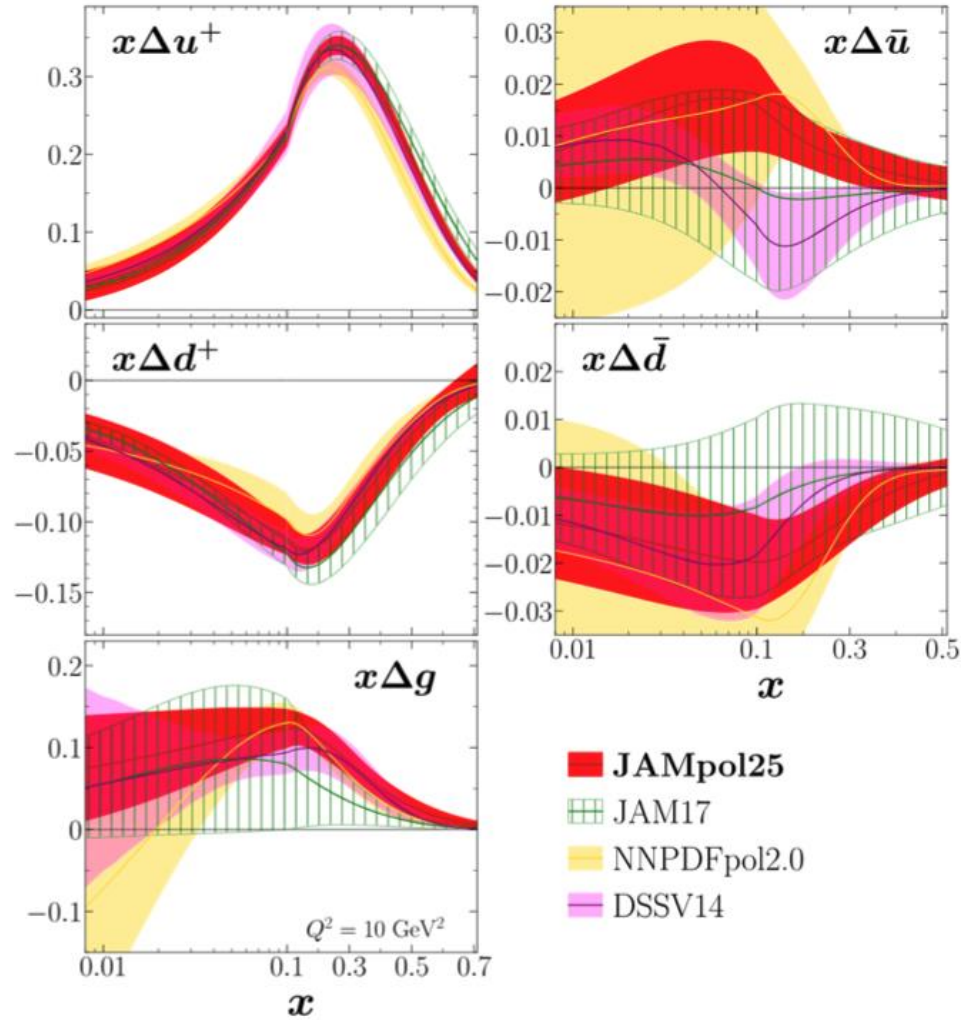
- New studies in the context of resummation with DYTurbo + xFitter
- Very good description of the low invariant mass spectrum data & good consistency in the description between high and low invariant mass data
- Extracted Collins Soper kernel compatible with literature.

# Others: Theory

Wally Melnitchouk

*Global QCD analysis of spin PDFs in the proton with high- and lattice constraints*

<https://agenda.infn.it/event/47074/contributions/290837/>



Michael Fucilla

*Spin-spin entanglement at high energy*

<https://agenda.infn.it/event/47074/contributions/289133/>

- New insights from new measurements on spin-spin entanglement
- We found several interesting theoretical insights about small- $x$  and dense QCD looking at spin correlations
  - **Pomeron** leaves characteristic imprints on the entanglement patterns between  $Q\bar{Q}$ -pair diffractively produced
  - Entanglement in  $b\bar{b}$ -photoproduction shows sensitivity to the **linearly polarized W.W. gluon distribution**
- Many challenges & opportunities

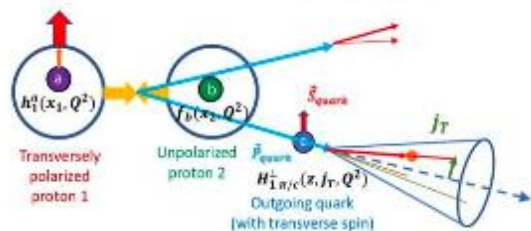
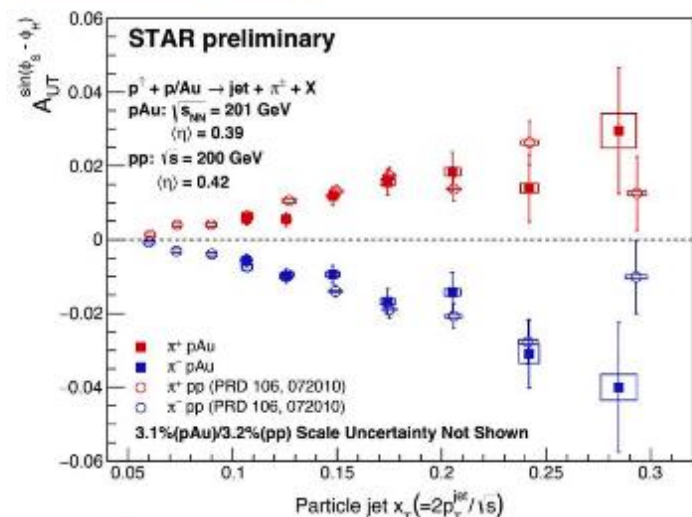
# Transverse spin asymmetries in $p^\uparrow p$ , $p^\uparrow N$

## STAR: new results

Collins asymmetry in  $p^\uparrow Au$ :

Compatible with  $p^\uparrow p$ , small suppression?

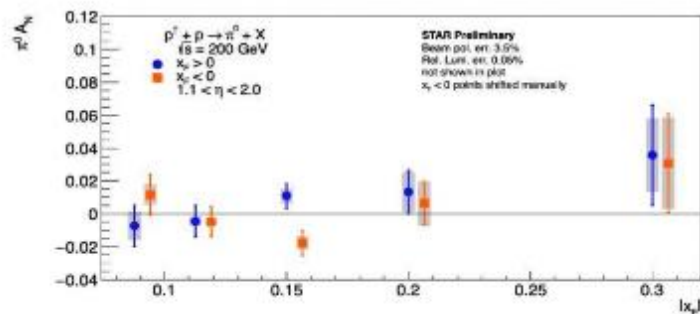
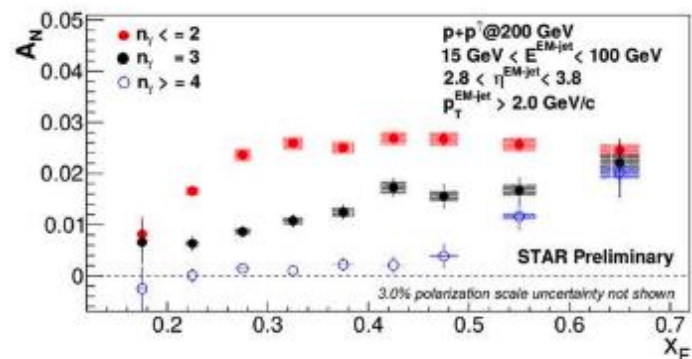
[\[B. Aboona, Tue\]](#)



$A_N$  and number of EM particles in a jet

$A_N$  of  $\pi^0$  at  $1 < \eta < 2$ ,  $\sqrt{s}=200$  GeV

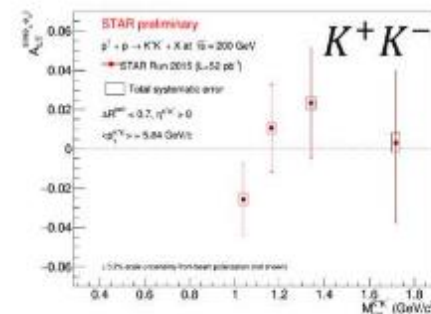
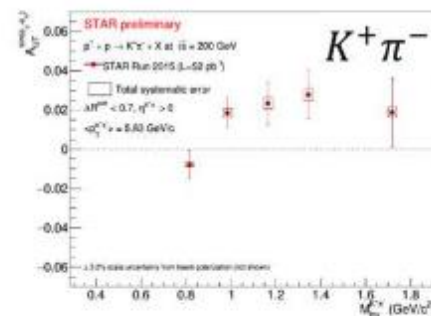
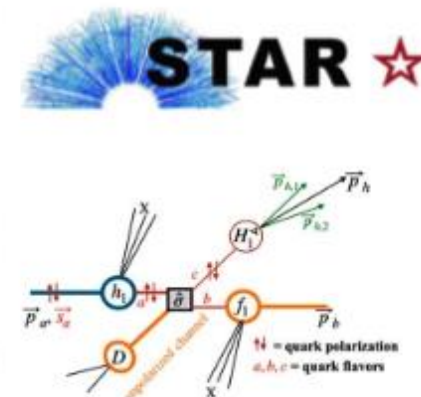
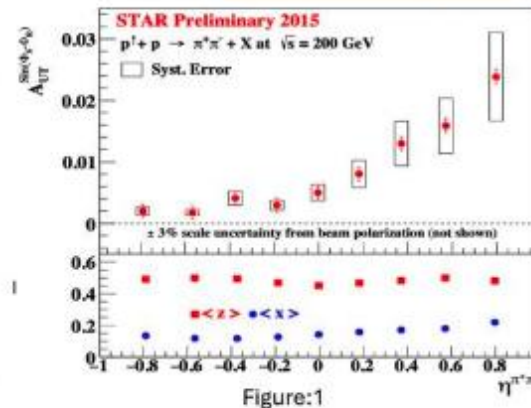
[\[D. Kapukchyan, Wed\]](#)



TSAs of  $\pi^+\pi^-$ ,  $K^+\pi^-$ ,  $\pi^+K^-$ ,  $K^+K^-$  in  $p^\uparrow p$

10x more data yet to be analysed

[\[A. Khanal, Thu\]](#)



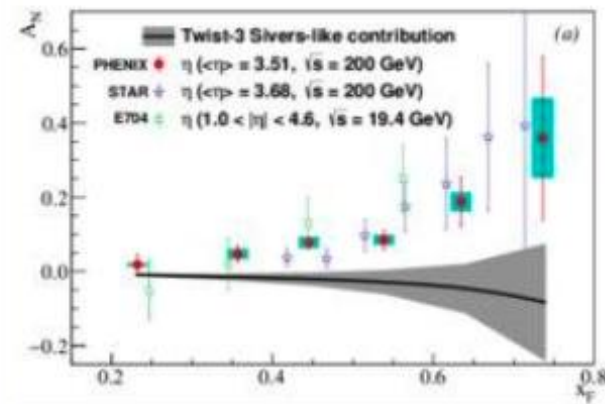
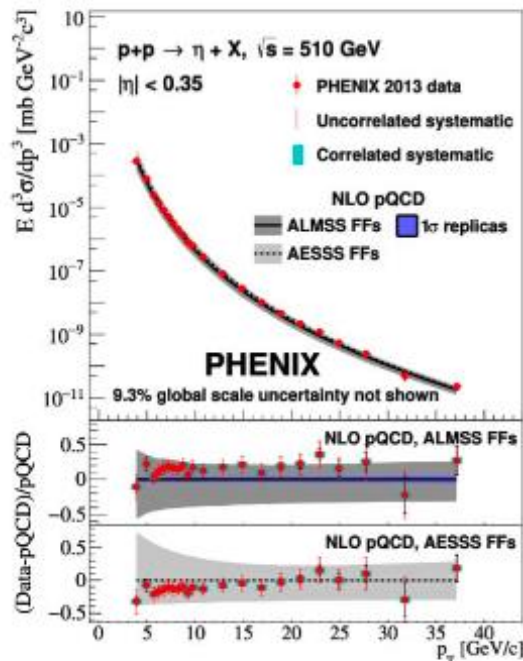
# Transverse spin asymmetries in $p^\uparrow p$ , $p^\uparrow N$

PHENIX news:  $\eta$  production in  $p^\uparrow p$

Cross-section: [\[arXiv:2507.04896\]](https://arxiv.org/abs/2507.04896)

$A_N$ : [\[Phys.Rev.D 113 \(2026\) 7\]](https://arxiv.org/abs/2507.04896)

[\[A. Bazilevsky, Wed\]](#) (nice overview too)

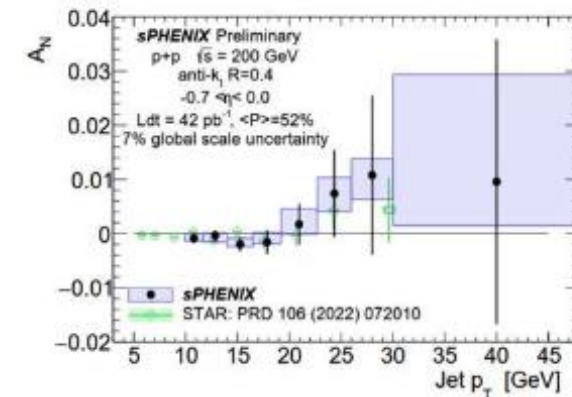
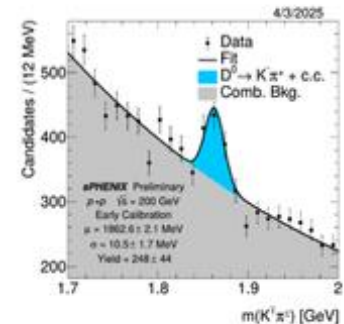
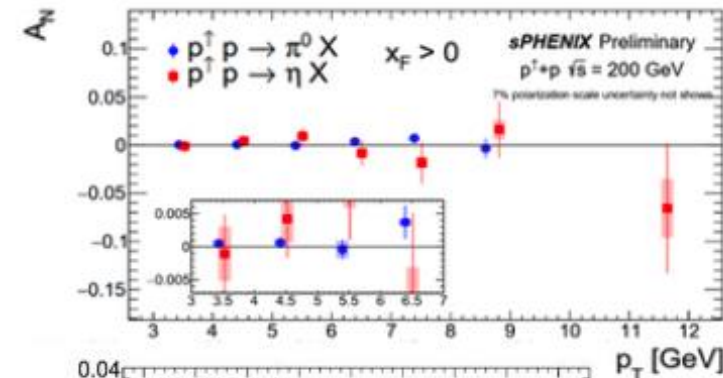


sPHENIX: new detector (2024–2026)

new results:  $\pi^0$ ,  $\eta$ , and jet  $A_N$  (40% of data)

ongoing analyses: direct  $\gamma$ ,  $D^0$ , h-in-jet, 2jet, 2h

[\[R. Seidl, Wed\]](#)



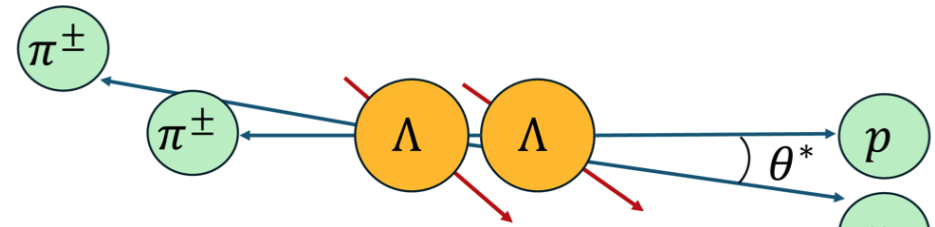
# Exp: Spin Correlation

Jieke Wang

Measurement of Lambda hyperons spin correlation in pp and pPb collisions at CMS

<https://agenda.infn.it/event/47074/contributions/289117/>

- $\Lambda$ -pair correlations from CMS.
- Spin correlation proposed to explain global polarization & spin alignment

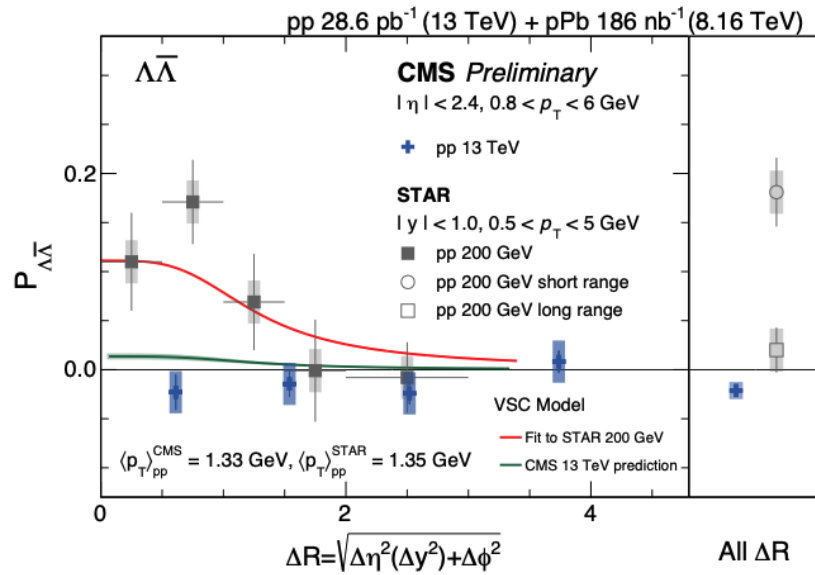


$$\frac{1}{N} \frac{dN}{d\cos\theta^*} = \frac{1}{2} (1 + \alpha_1 \alpha_2 P_{\Lambda_1 \Lambda_2} \cos\theta^*)$$

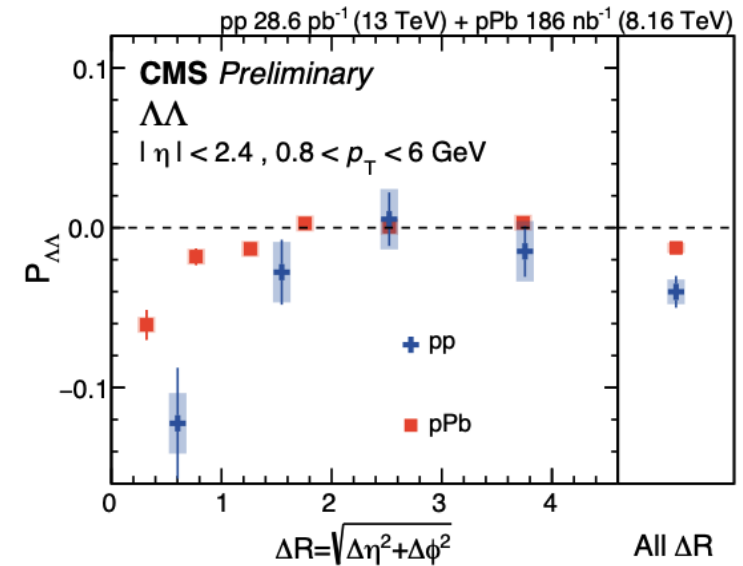
Picture : Zhoudunming Tu

Correlation of  $\Lambda$ 's spin

pp 13TeV  
pp 200GeV



VSC model  
F.Liu, Z.Tu  
work in progress



Different behavior from STAR measurements at 200GeV  
Might be due to different production mechanism at RHIC and LHC energies  
VSC(vacuum-spin-chain) model predicts small positive values

# Working Group Report Talks

Nice summaries of presentations in each working group:

➤ Report WG1: Structure Functions and Parton Densities

<https://agenda.infn.it/event/47074/contributions/289232/attachments/149851/229284/WG1%20summary.pdf>

➤ Report WG2: Small-x, Diffraction and Vector Mesons

[https://agenda.infn.it/event/47074/contributions/289233/attachments/149840/229293/2026\\_DIS\\_WG2.pdf](https://agenda.infn.it/event/47074/contributions/289233/attachments/149840/229293/2026_DIS_WG2.pdf)

➤ Report WG3: Electroweak Physics and Beyond the Standard Model

<https://agenda.infn.it/event/47074/contributions/289234/attachments/149849/229304/DIS%20WG3%20summary.pdf>

➤ Report WG4: QCD with Heavy Flavors and Hadronic Final States

[https://agenda.infn.it/event/47074/contributions/289235/attachments/149831/229308/DIS2026\\_WG4\\_summary.pdf](https://agenda.infn.it/event/47074/contributions/289235/attachments/149831/229308/DIS2026_WG4_summary.pdf)

➤ Report WG5: Spin and 3D Structure

<https://agenda.infn.it/event/47074/contributions/289236/attachments/149834/229272/WG5report.pdf>

➤ Report WG6: Current Upgrades and Future Experiments

<https://agenda.infn.it/event/47074/contributions/289237/attachments/149852/229306/WG6-05-08-DIS.pdf>

# Plenary Talks

## Spin and 3D structure: theoretical advances

M. Diehl

Deutsches Elektronen-Synchrotron DESY

DIS2026, Bologna, 4 May 2026

HELMHOLTZ



special thanks to J Blümlein, V Braun, Y Ji, G Marinelli, M Schlegel, A Vladimirov,  
W Vogelsang, and F Wunder for helpful discussions or correspondence

## Lattice QCD input for DIS



Constantia Alexandrou



DIS2026

4-8 May 2026

33<sup>rd</sup> INTERNATIONAL WORKSHOP ON DEEP INELASTIC  
SCATTERING AND RELATED SUBJECTS, Bologna, Italy



33<sup>rd</sup> INTERNATIONAL WORKSHOP ON DEEP INELASTIC SCATTERING AND RELATED SUBJECTS | 4-8 MAY 2026 | BOLOGNA, ITALY

## DIS with ion beams: ultra-peripheral collisions

Exploring photon-induced interactions in heavy-ion collisions

Minjung Kim | CERN



# That's it, thank you!