
Highlights from USTC 2025-2026

Lailin Xu for the USTC ATLAS Group

ATLAS-China faculty meeting 2026
Zhengzhou, Apr 24-26, 2026

The USTC ATLAS Group

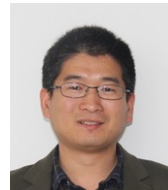
Permanent (full and associate professors)



Zhengguo Zhao
IR, overseeing



Liang Han
SM, BSM, NSW



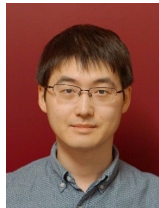
Yanwen Liu
HGTD, RPC,
Higgs, SM, BSM



Yongjie Sun
RPC detector



Minghui Liu
SM, BSM



Yusheng Wu
IR, Upgrades,
SM, Higgs, BSM



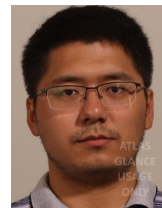
Lailin Xu
HGTD, SM,
Higgs, BSM



Hongtao Yang
Higgs, HGTD,
Timing pixel



Qipeng Hu
Heavy ion,
Trigger



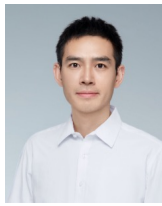
Siqi Yang
SM, Pheno/PDF



Hao Liang
RPC electronics



Lei Zhao
HGTD electronics



Jinhong Wang
NSW electronics



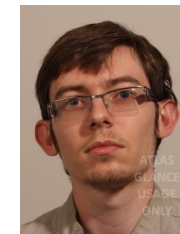
Zhe Cao
timing pixel electronics

Visiting professors



Toni Baroncelli
muon upgrade

Research scientists

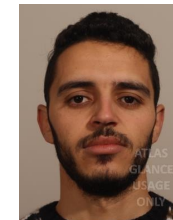


Francois Lagarde
RPC

Postdocs



Antonio Giannini
SM, BSM, jet
tagging, RPC perf.



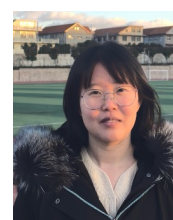
Mohamed Zaazoua
RPC operation,
upgrade, BSM, SM



Yassine El Ghazali
SM, BSM, HGTD



Mingyi Liu
SM, BSM,

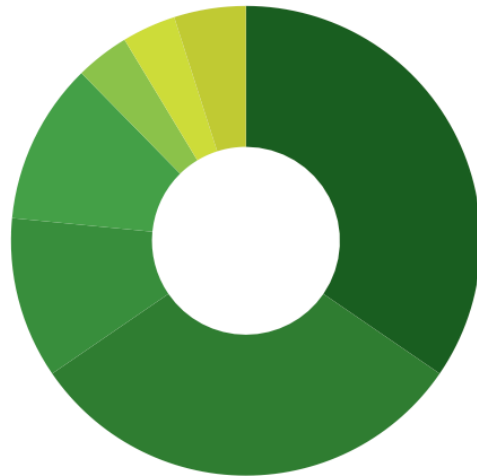


Yang He
Heavy Ion

- + students (~30 graduate + ~10 under)
- + electronics postdocs (3)
- + technicians (3)
- + secretariat

The USTC ATLAS Group

▶ Professional Status



- ▶ 28 Physicist
- ▶ 25 Physics PhD student
- ▶ 9 Physics masters/diploma student
- ▶ 9 Undergraduate/summer student
- ▶ 3 Engineer with PhD
- ▶ 0 Engineer without PhD
- ▶ 3 Engineering student
- ▶ 4 Technician or equivalent
- ▶ 0 Administrator/other

▶ Lists



- ▶ 35 on Authorlist (A)
- ▶ 6 Signing-Only (a)
- ▶ 16 counted for M&O (M)
- ▶ 10 qualifying members (q)
- ▶ 37.75 for Operation Tasks (O, o)

Upgrade: RPC

- A new generation of thin-gap RPCs in the barrel inner(BI) region
 - Higher rate capability with 1mm gas gap: 300 Hz/cm² → 1k Hz/cm²
 - Higher trigger efficiency: 70% → 90%
- BI-RPC:
 - Max size of singlets: 1820mm*1096mm
 - 9000 front-end boards
- New Front-End Electronics
- New readout design: η - η readout for 2D

China contributions
(USTC, SJTU, SDU, ZZU)

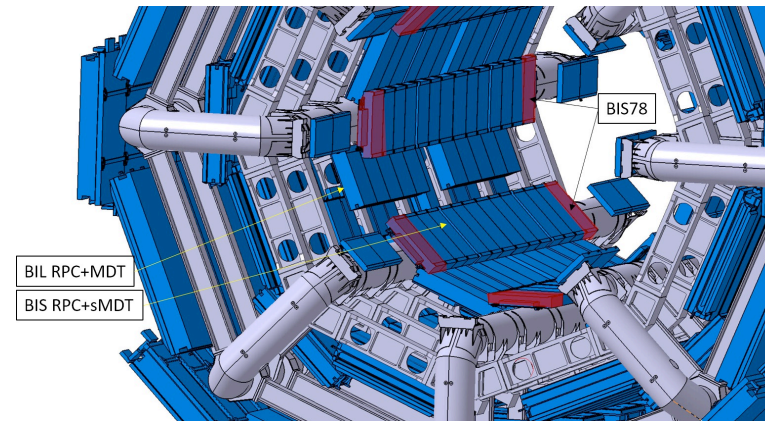
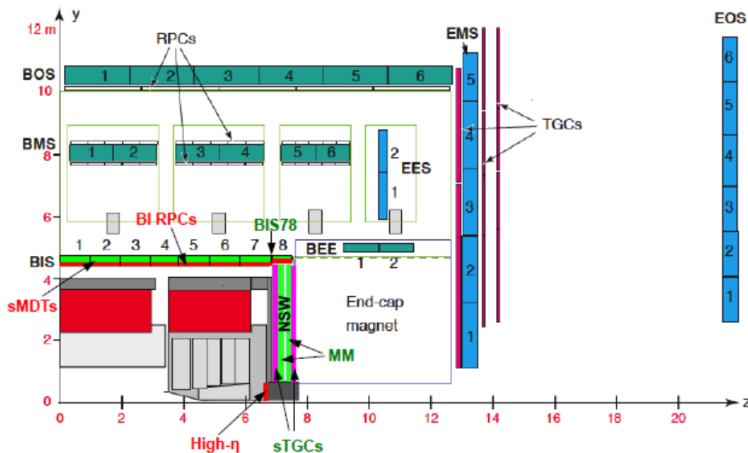
Gas gap: 72 (~10%)

Readout panel: 912 (~50%)

FE board: 5000 (>50%)

Singlet: 360 (~50%)

Installation & commissioning

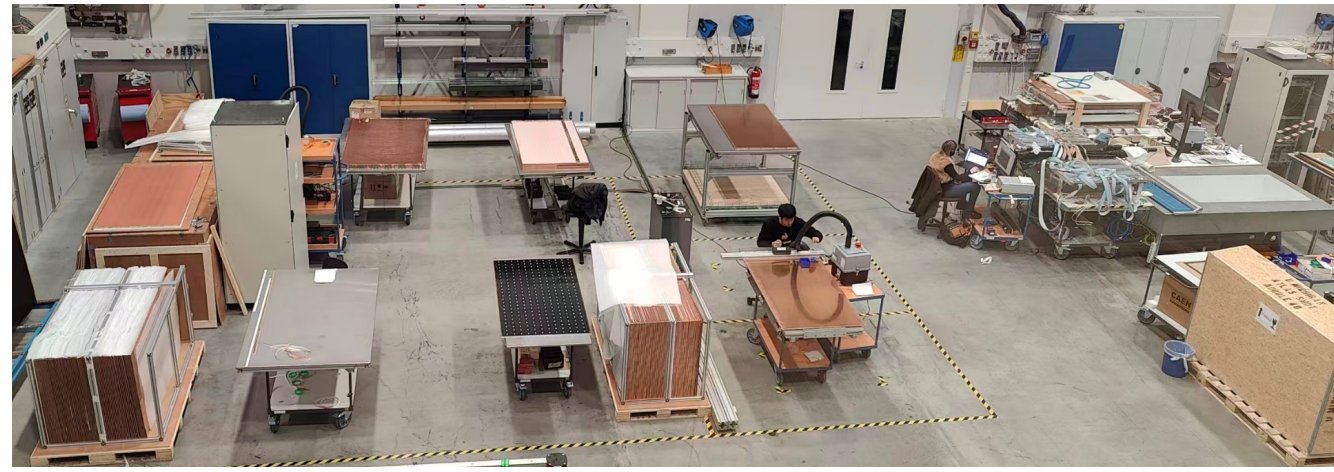
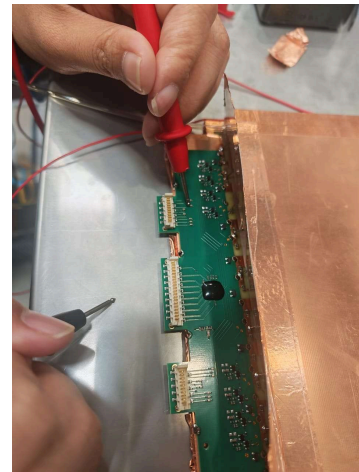
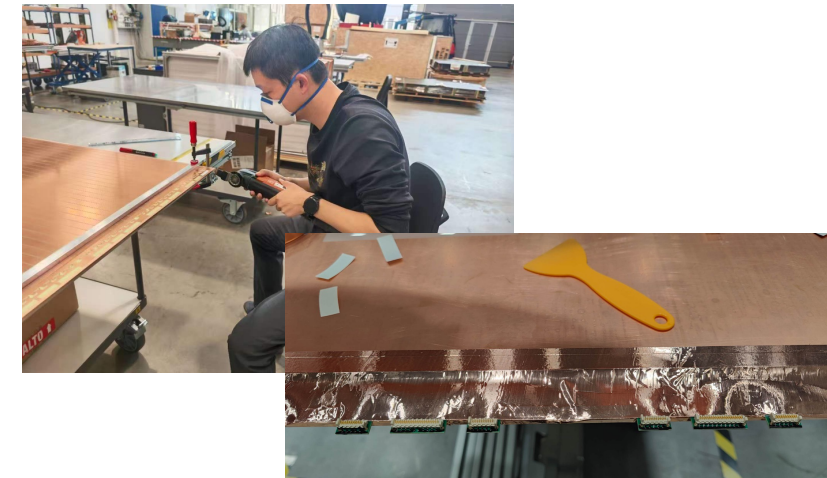


Upgrade: RPC

- Full production line has been set up in MPI.
- BIS singlets assembly with full readout chain.
- 10 BIS singlets have been built successfully and qualified.
- Demonstrate the proper procedures of manufactory and quality control.
- A four-person team working at MPI guarantees a production rate of 2 BIS singlets/day.
- All 288 BIS singlets can be completed by the end of 2026.

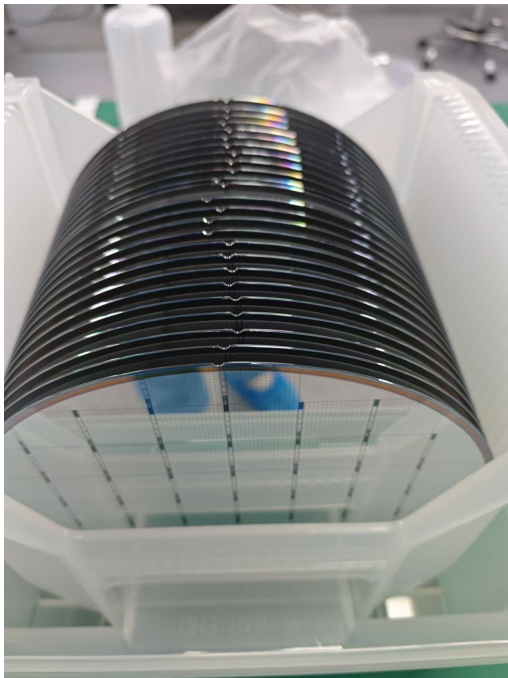
BIS assembly main steps

- 1) Cutting of the 2 read-out panels
- 2) Taping of the 2 read-out panels
- 3) 2 read-out + gas-gap assembly
- 4) Soldering of the wires
- 5) Dimensions/thickness measurements
- 6) Front-ends soldering
- 7) Faraday cage assembly
- 8) Cosmic-ray test



Upgrade: HGTD

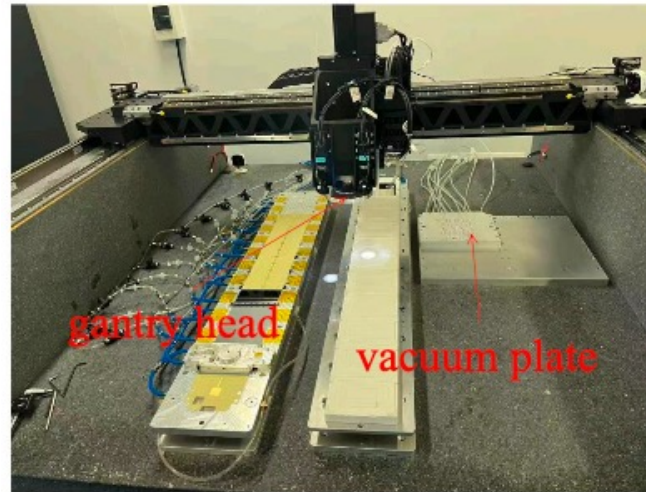
- Sensor: production on schedule
 - USTC-IME in-kind production contract signed on Dec. 8, 2025
 - **Fabrication finished.** QC in progress. Expect to finish by June 2026



Batch	Pass_Count	Wafer Count	B1_Count	B2_Count
batch pilot	58	2	18	0
batch 1	554	17	17	31
batch 2	74	2	8	2
batch 3	67	2	8	0
batch 4	22	1	4	0
Total	775	24	55	33
Avg	32.3		2.3	1.4

Upgrade: HGTD

- Module assembly and loading:
 - Loading process developed on the AMS gantry in Hall-3 at IHEP
 - Pick-and-place, glue and loading verified with FO05DU
 - Production of other types of VP in progress
 - Guoqiang Zheng: finalize procedure and training documentation (AQT)

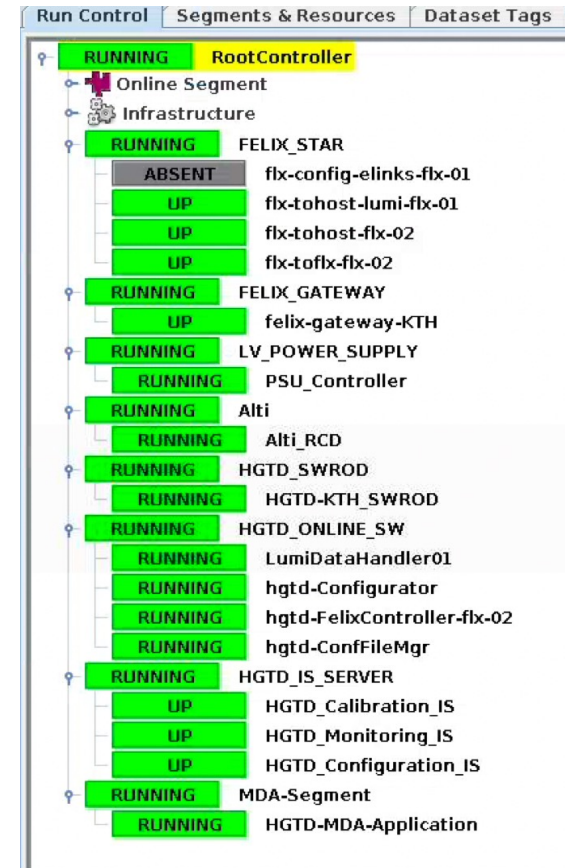
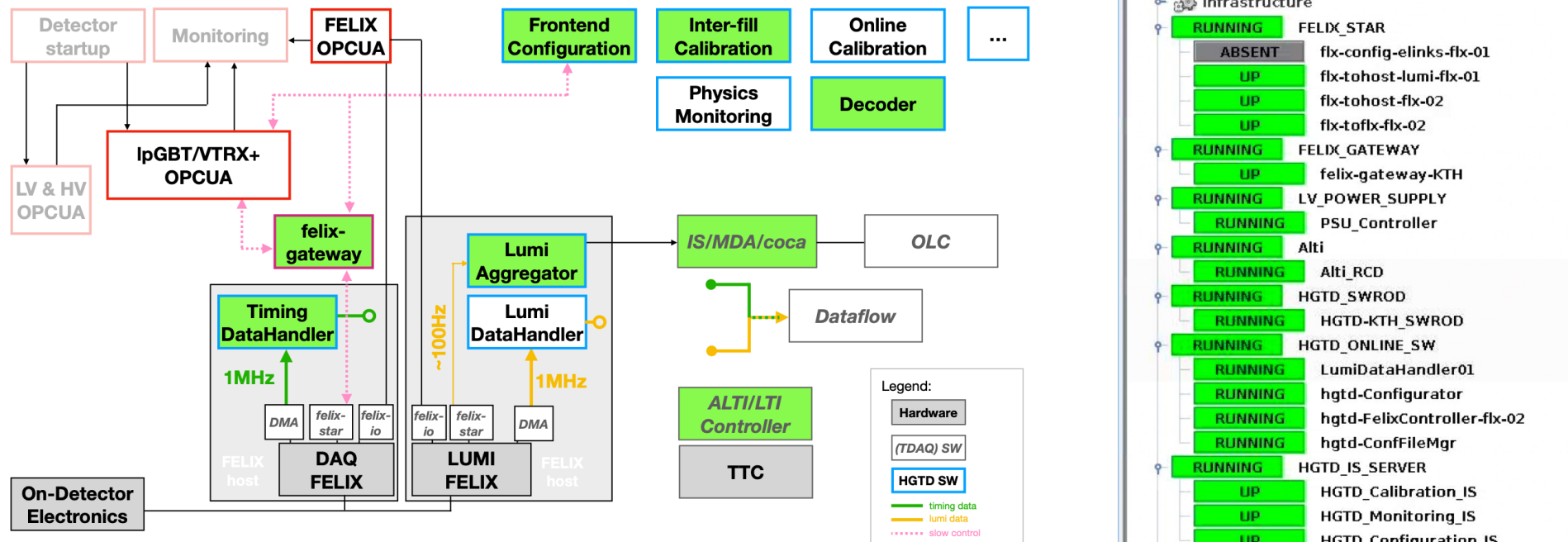


Upgrade: HGTD

- Activities on DAQ and software
 - Yassine El Ghazali : decoder for DAQ software
 - Aonan Wang: design and implementation of online calibration process

HGTD-DCS

HGTD-TDAQ

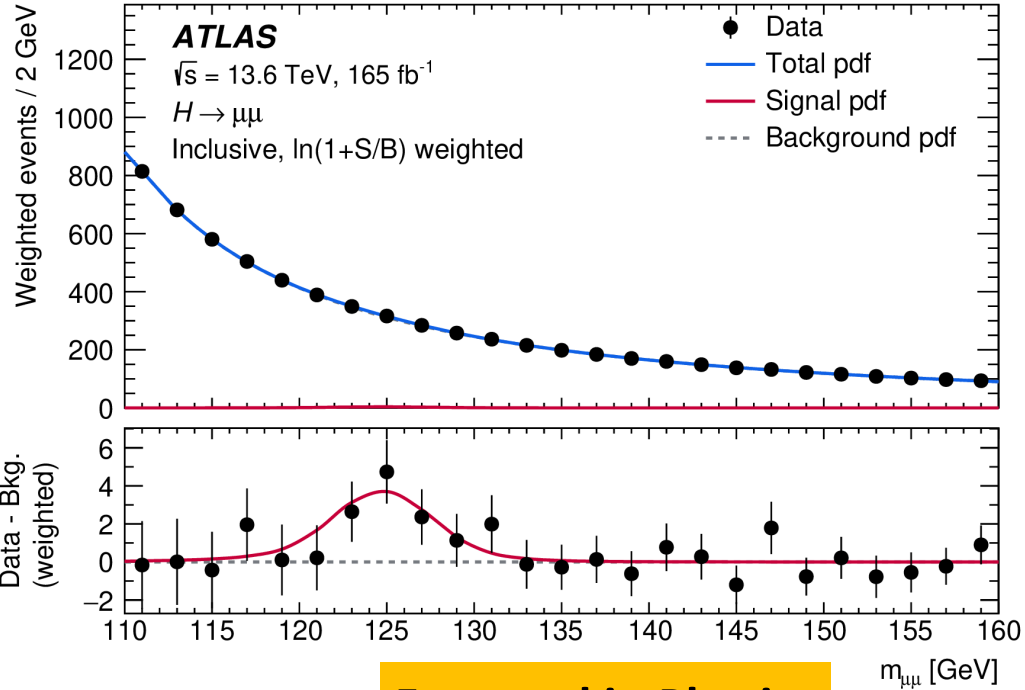


Physics and Performance

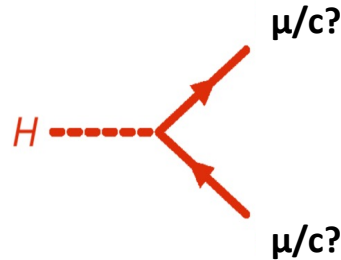
- USTC has strong involvement in physics and performance
- Physics:
 - Higgs & DiHiggs ($\gamma\gamma, ZZ$)
 - Standard Model (Diboson/multiboson, Electroweak precision measurements, PDF)
 - BSM, Exotics
- Performance
 - Muons, Egamma
 - JetEtmis, Flavor tagging

Highlights: evidence of $H \rightarrow \mu\mu$

[Phys. Rev. Lett. 135 \(2025\) 231802](#)



- Based on partial Run3 2022-2024 data, and statistical combination with Run2
- Close collaboration with other Chinese institutes, IHEP, SDU, NJU, etc



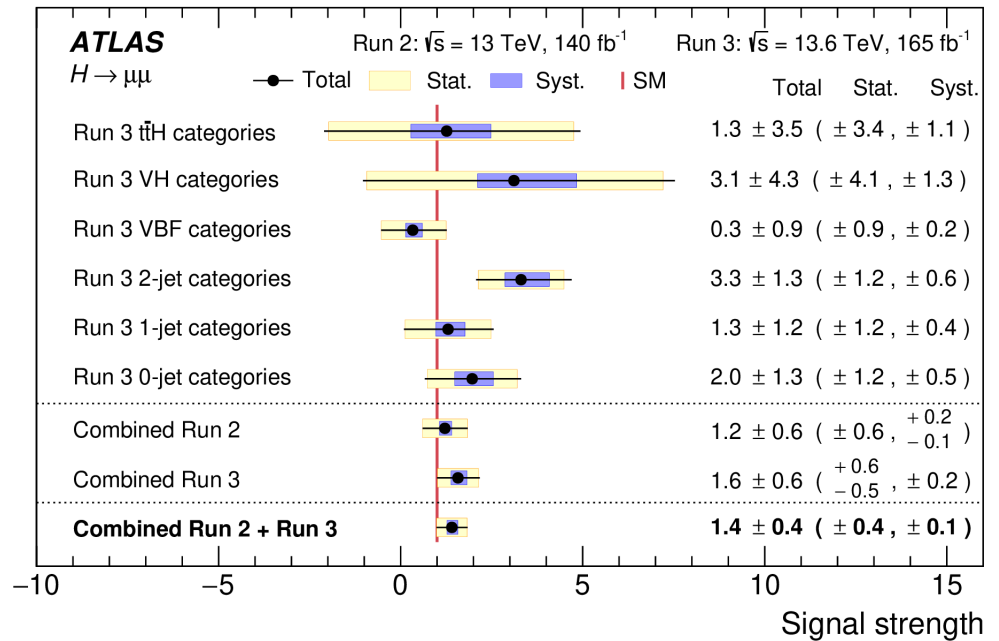
Featured in Physics Editors' suggestion

Physics VIEWPOINT

[Deciphering the Origin of Quark and Lepton Mass](#)

Published 3 December, 2025

Measurements of the decay of the Higgs boson into muon-antimuon pairs provide for the mechanism by which quarks and leptons acquire their mass.



Highlights: Higgs HVV CP measurement

[arXiv:2603.20117](https://arxiv.org/abs/2603.20117) (submitted to PRL)

- Close collaboration with IHEP, NJU, etc

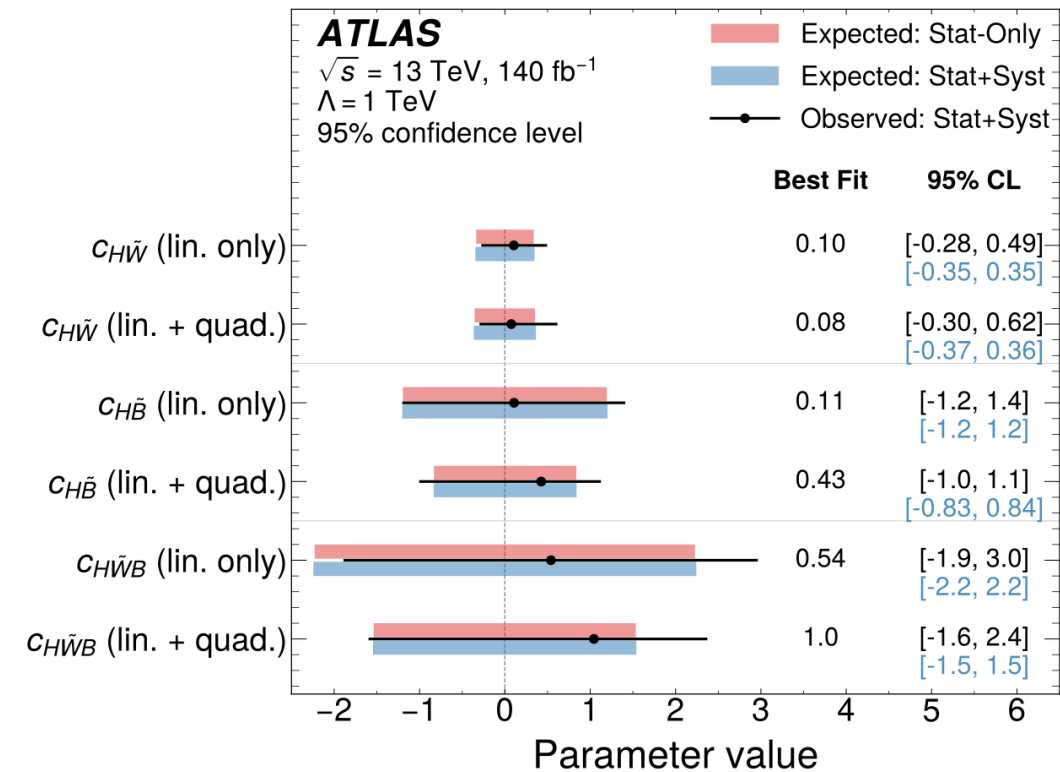
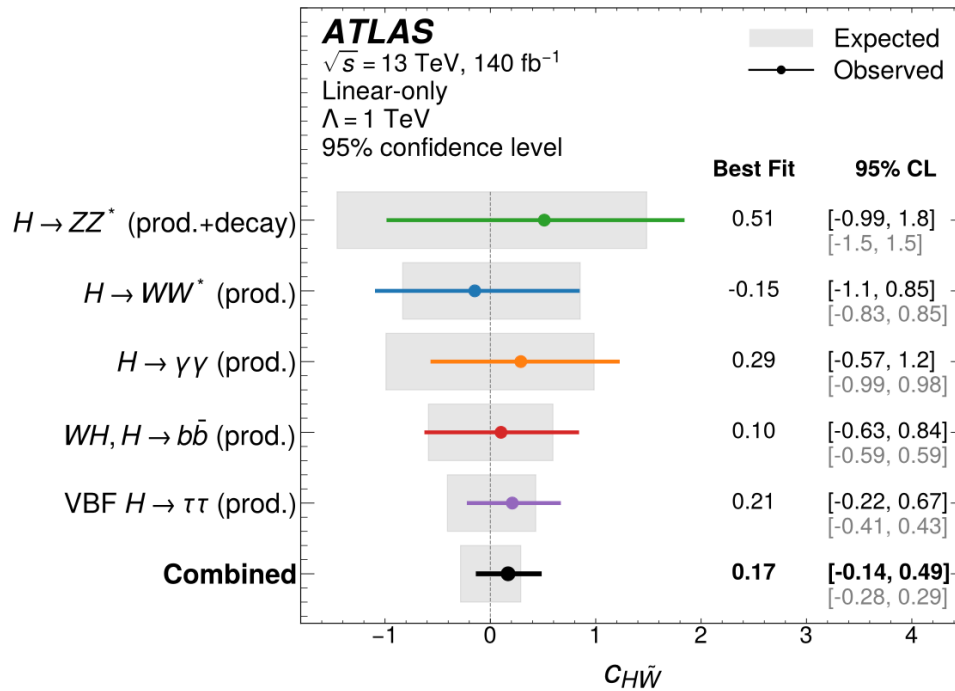
Physics Briefing

Tags:
Higgs boson,

How “odd” are Higgs boson interactions?

27 March 2026 | By ATLAS Collaboration

<https://atlas.cern/Updates/Briefing/Odd-Higgs-Interactions>



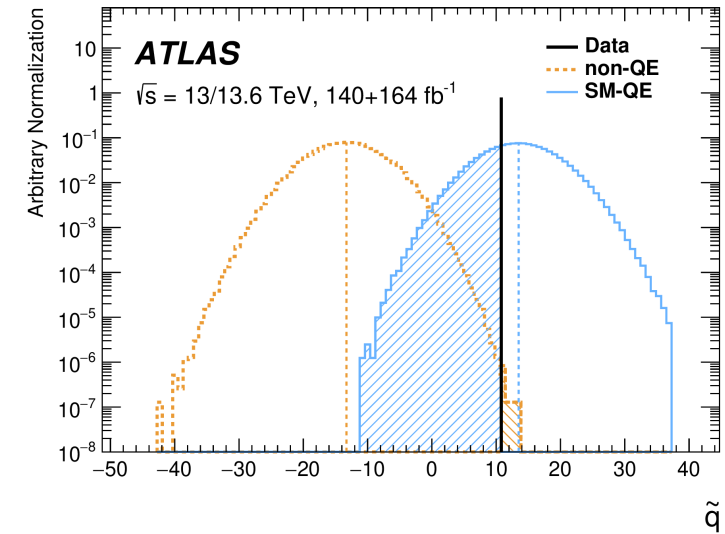
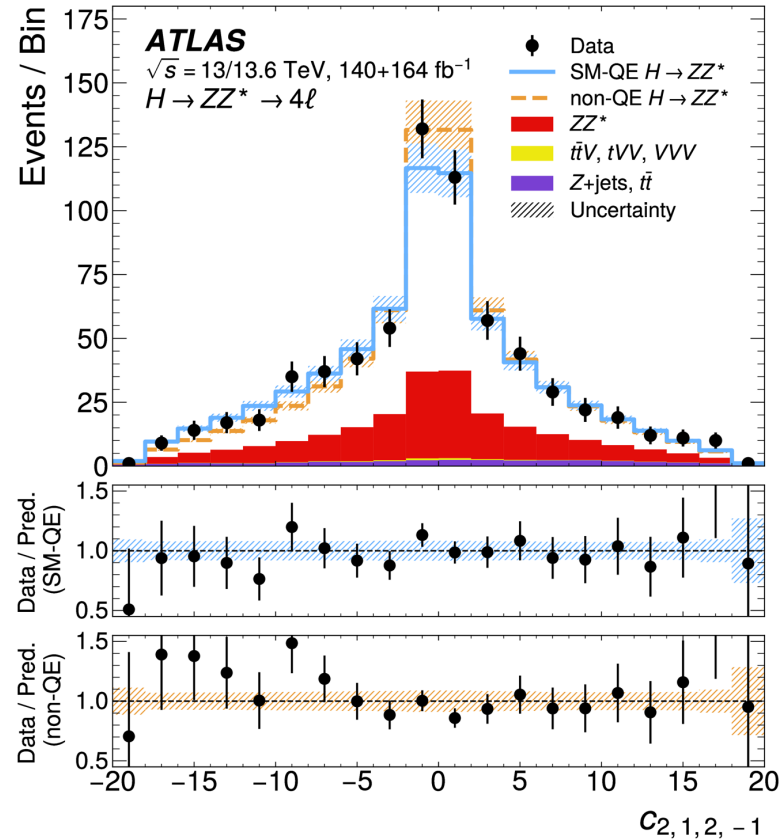
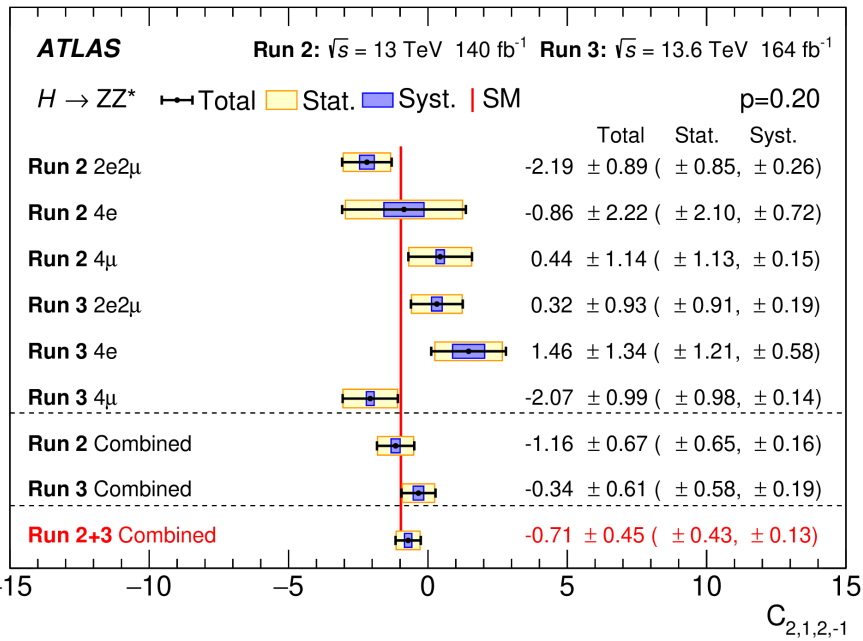
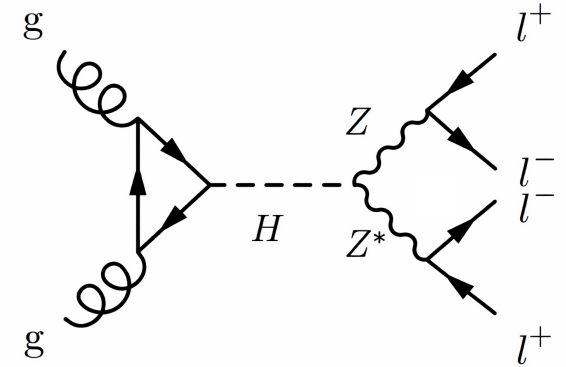
**3D ($c_{H\tilde{W}}, c_{H\tilde{B}}, c_{H\tilde{W}B}$) fit results for the first time!
 Enabled by the combination**

Highlights: quantum entanglement in $H \rightarrow ZZ^*$

[arXiv:2603.26463](https://arxiv.org/abs/2603.26463) (submitted to PRL)

- Close collaboration with IHEP, etc

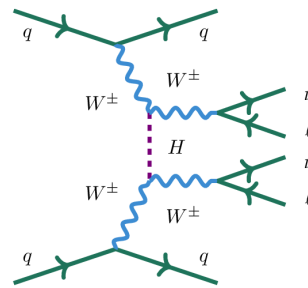
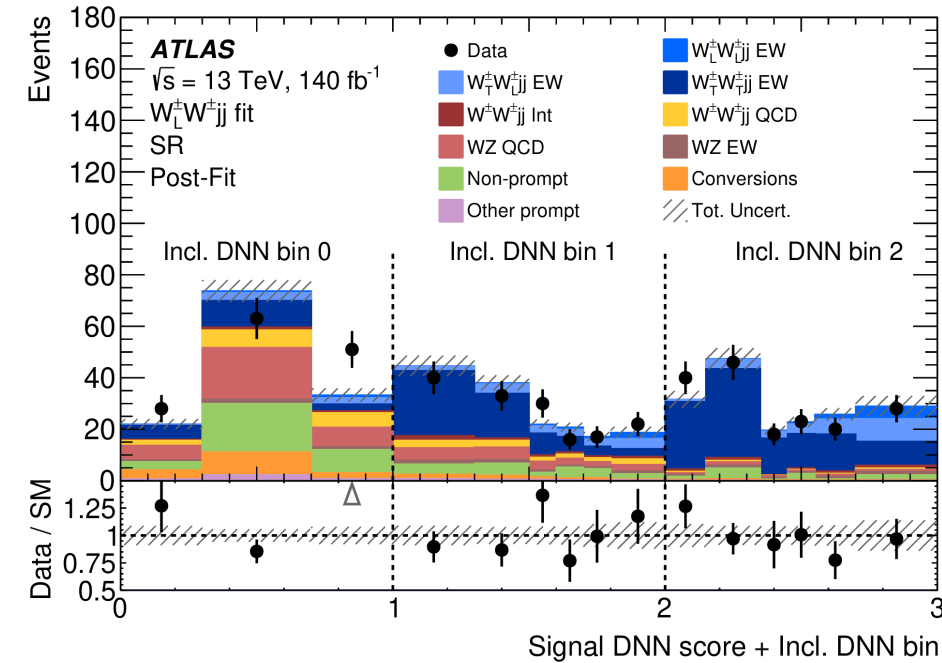
$$H = |\Psi^-\rangle \equiv \frac{1}{\sqrt{2}} (|\uparrow\rangle|\downarrow\rangle - |\downarrow\rangle|\uparrow\rangle)$$



Highlights: evidence of polarized $W_L^\pm W^\pm jj$ scattering

[Phys. Rev. Lett. 135 \(2025\) 111802](#)

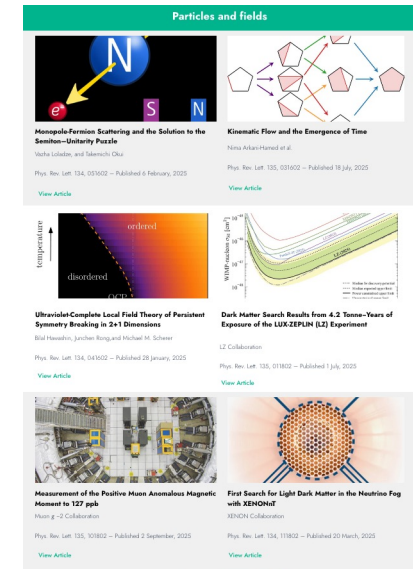
- Direct probe of the Electroweak Symmetry Breaking



Featured in Physics Editors' suggestion



[PRL Collection 2025](#)



Physics VIEWPOINT



[Probing the Higgs Mechanism with Particle Collisions and AI](#)

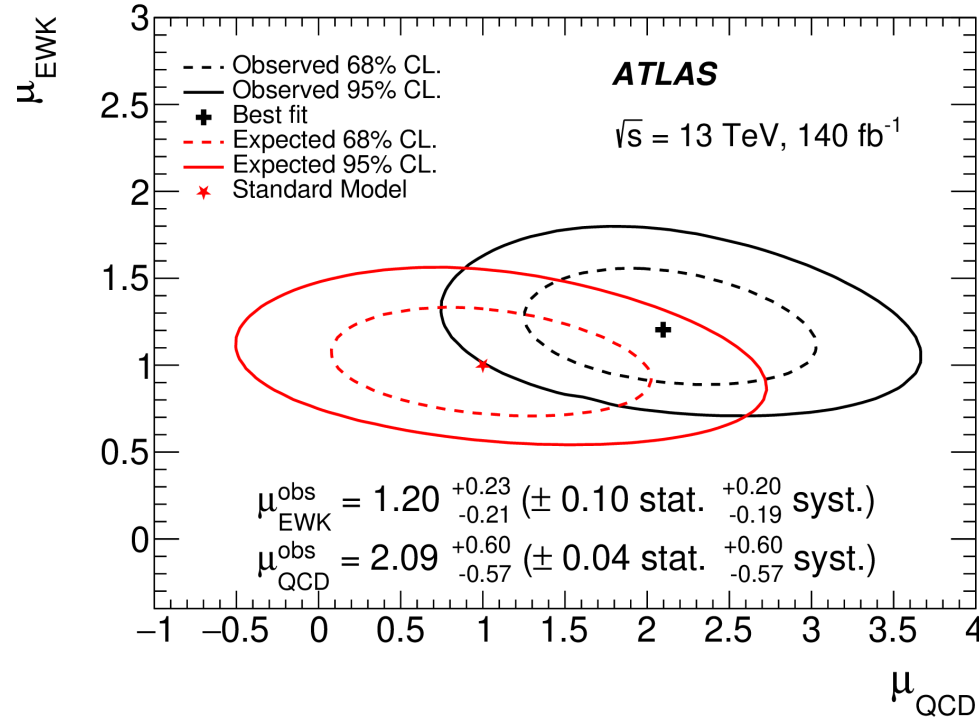
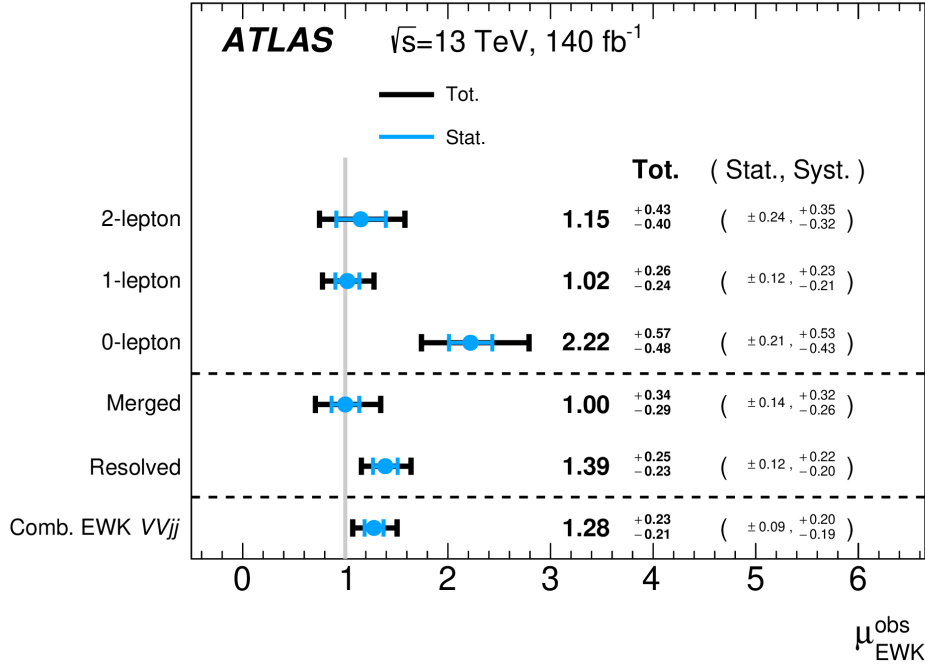
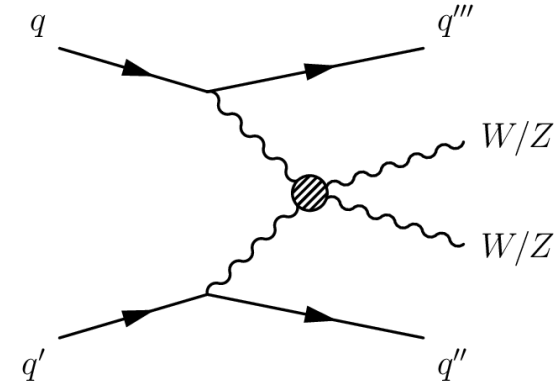
Published 10 September, 2025

A deep neural network has proven essential in confirming a key prediction of one of the standard model's cornerstones.

Highlights: observation of semileptonic VV scattering

[arXiv:2503.17461](https://arxiv.org/abs/2503.17461) (accepted by EJPC)

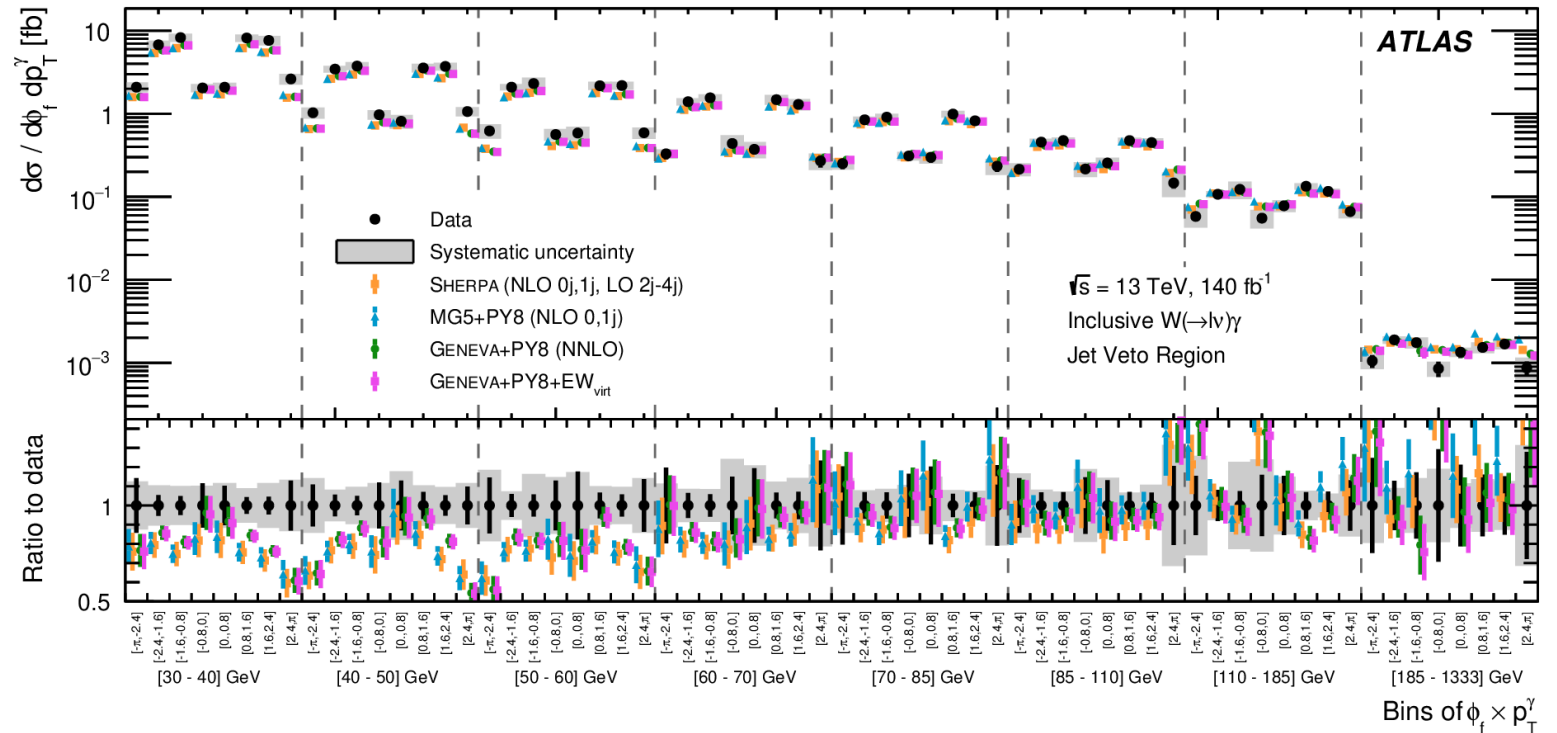
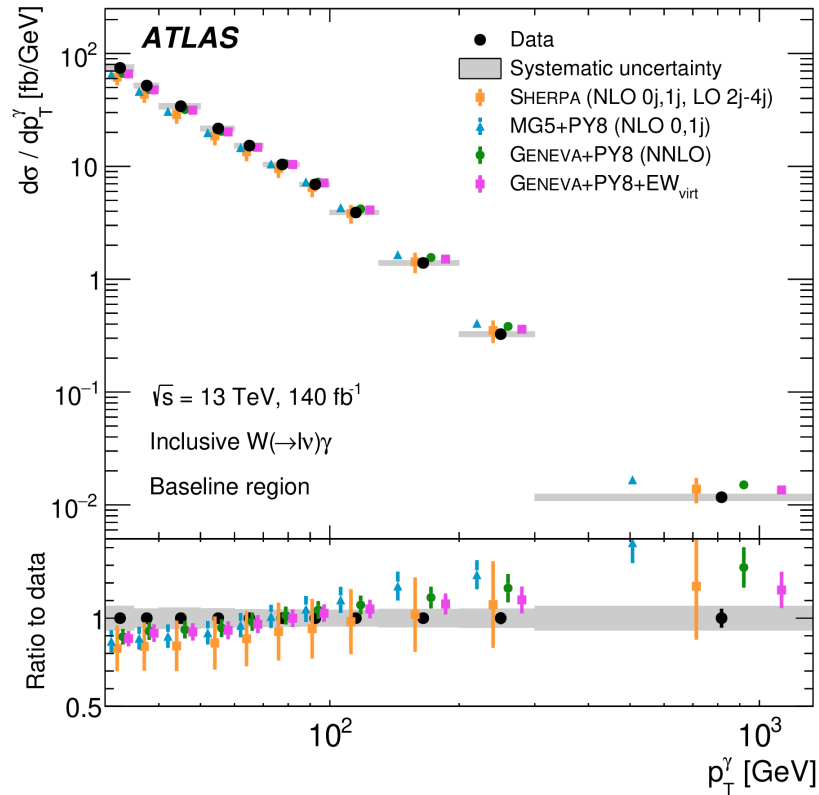
- Close collaboration with SDU, etc



Highlights: precision $W\gamma$ measurements

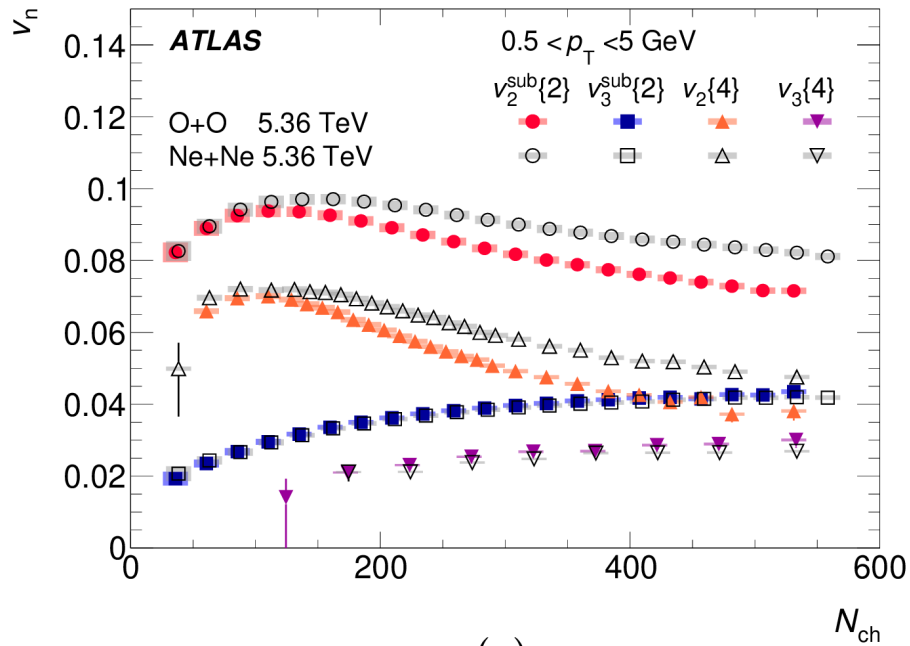
[arXiv:2603.22478](https://arxiv.org/abs/2603.22478)

- Close collaboration with SJTU, etc

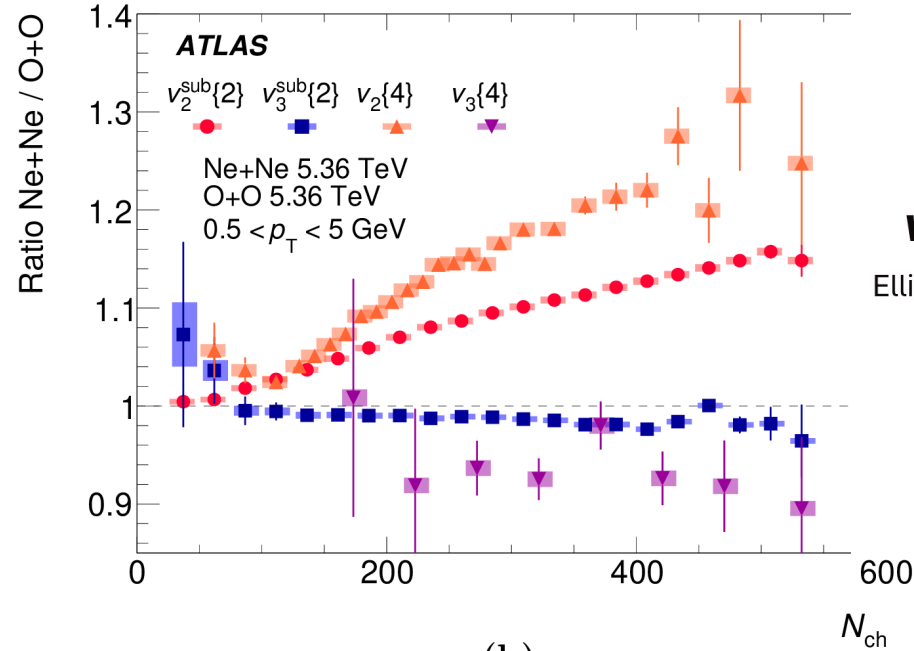


Highlights: heavy(light)-ion

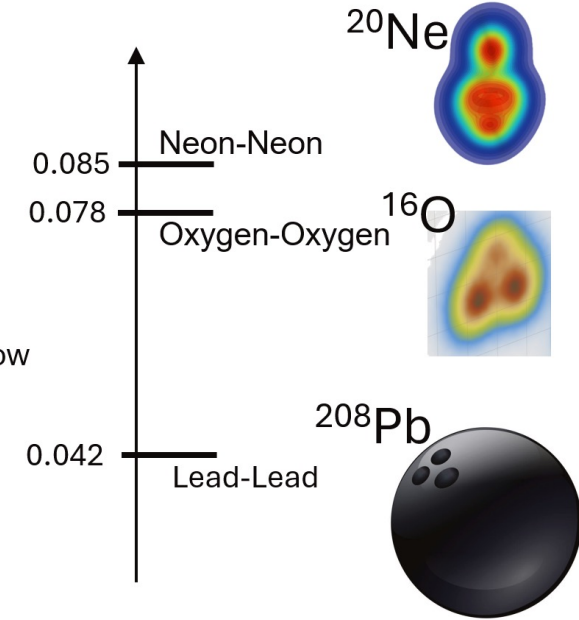
[Phys.Rev.C 113 \(2026\) 4, 045205](#)



(a)



(b)



first measurements of the azimuthal anisotropy in $\sqrt{s_{NN}} = 5.36 \text{ TeV } ^{16}\text{O} + ^{16}\text{O}$ and $^{20}\text{Ne} + ^{20}\text{Ne}$ collisions

Physics Briefing

Bowling balls vs. bowling pins?
 ATLAS studies the unique shape of
 neon ions

Tags:
 physics results
 heavy ion
 light ion
 Run 3

8 September 2025 | By ATLAS Collaboration

<https://atlas.cern/Updates/Briefing/Oxygen-Neon-Flow>

Highlights: Flavor tagging

[Nature Commun. 17 \(2026\) 541](#)

- Close collaboration with other Chinese institutes, SYSU, SJTU, NJU, etc

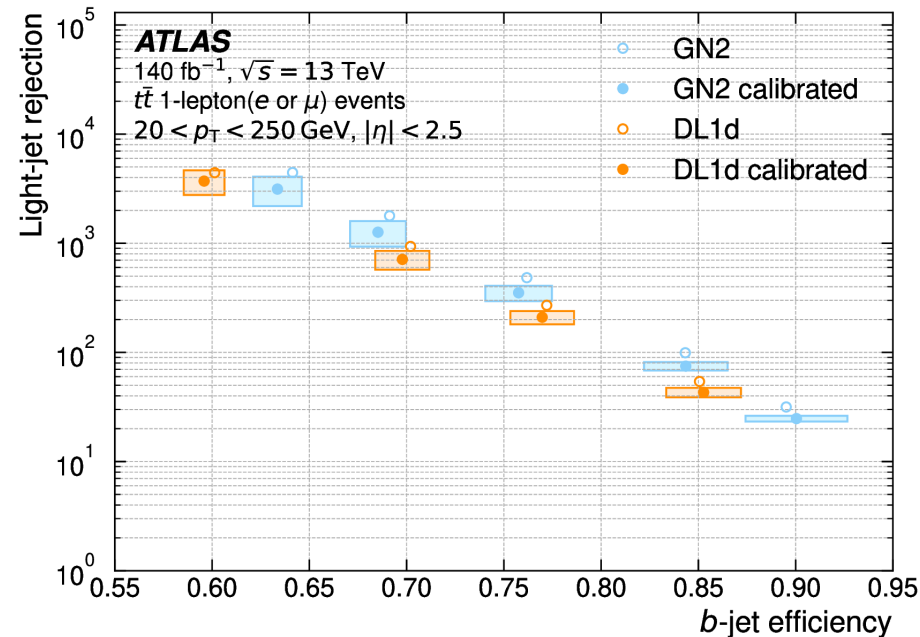
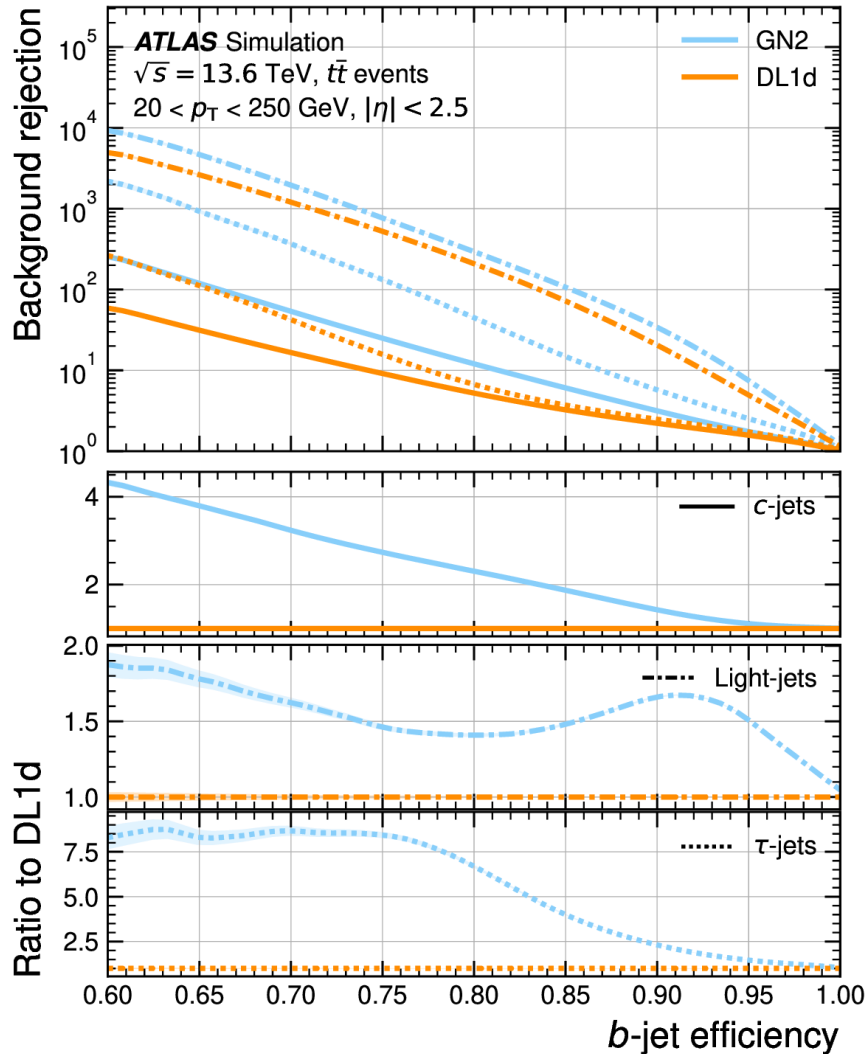
Physics Briefing

Tags:
jets
EPS 2025
machine learning

ATLAS enters a new era of jet flavour tagging – powered by AI

7 July 2025 | By ATLAS Collaboration

<https://atlas.cern/Updates/Briefing/GN2-Jet-Flavour-Tagging>



ATLAS roles

- CB Chair Advisory Group member: Yanwen Liu (2026-27)
- Upgrade Advisory Board Member (China NSFC+MSTC): Yusheng Wu
- Muon Phase-II WBS 5.3 RPC Production BIS Coordinator: Yongjie Sun
- HGTD Luminosity, DAQ and Controls Coordinator: Lailin Xu

- Convener Standard Model WG: Yusheng Wu (2024-26)
- Convener Higgs and Di-Higgs Physics (HIGP) WG: Hongtao Yang (2025-27)
- Convener Heavy Ions WG: Qipeng Hu (2023-25)
- Convener LHC Heavy Ions WG: Qipeng Hu (2025-27)

- Convener of JETM subgroup: Jet Tagging (JetTag): Antonio Giannini (2025-27)
- DP - Reprocessing Coordinator: Antonio Giannini (2025-27)
- Convener of EGAM subgroup: Photon Identification and Efficiencies: Francisco Sili (2026-28)

- Publication Committee member: Lailin Xu (2024-26)
- Publication Committee member: Qipeng Hu (2026-28)

ATLAS CONF talks

<u>Conference</u>	<u>Date</u>	<u>Title</u>	<u>Speaker</u>	
MoriondQCD2026	22-Mar-26	Standard Model multibosons at ATLAS and CMS	Antonio Giannini	
MoriondEW2026	15-Mar-26	Recent single Higgs measurements with the ATLAS detector	Lailin Xu	
MoriondEW2026	15-Mar-26	Evidence for the dimuon decay of the Higgs boson with the ATLAS detector	Ehsan Mushajiang	
Higgs2025	27-Oct-25	Combined Higgs boson measurements and their interpretations with the ATLAS experiment	Yangfan Zhang	
BSM2025	6-Oct-25	Highlights of recent electroweak and QCD measurements in ATLAS	Yanwen Liu	
Corfu2025	24-Aug-25	Exotics and BSM (non SUSY, non DM) in ATLAS and CMS	Yassine El Ghazali	
HiggsHunting2025	15-Jul-25	Constraining the Higgs boson width from Higgs-top Yukawa coupling at the ATLAS experiment	Yangfan Zhang	
EPS-HEP 2025	7-Jul-25	A combined test of CP violation in Higgs Boson coupling with electroweak gauge boson (W/Z)	Haoquan Ren	Poster
EPS-HEP 2025	7-Jul-25	Results from muon reconstruction performance with the ATLAS experiment at the LHC using Run-3 proton-proton collision data	Xingyu Wu	Poster
WIN2025	9-Jun-25	Differential inclusive single W/Z measurements sensitive to PDFs, EFT in ATLAS+CMS	Zihan Zhao	
LHCP2025	4-May-25	Results from muon reconstruction performance with the ATLAS experiment at the LHC using Run-3 proton-proton collision data	Chunhao Tian	Poster
LHCP2025	4-May-25	Constraints on couplings to second generation fermions from ATLAS	Chunhao Tian	

OTP

USTC ATLAS: 35 authors, 16 counted for M&O (2025)

OTP	Required 2025	Fullfilled 2025
Class 1+2	435	354
Class 3	11	4.71FTE
Upgrade	8.5	10.87 FTE

We need to improve for class 3

OTP	Required 2022/2023/2024	Fullfilled 2022/2023/2024
Class 1+2	~350/~350/~400	302 / 214 / 439
Class 3	~10/~10/~11	2.98 / 3.77 / 6.05 FTE
Upgrade	~6/~6/~7	8.74 / 9.71 / 8.78 FTE

Summary

- In 2025-26, the USTC ATLAS Group keeps actively involved in various activities of the collaboration, upgrades, operation, physics and performance
- USTC members made key contributions to several key physics results highlighted by Physics Briefing/CERN News
- USTC members takes several leadership roles in upgrades/performance/physics
- OTP: need to improve for class-3
- Open to and looking forward closer collaboration with other institutes