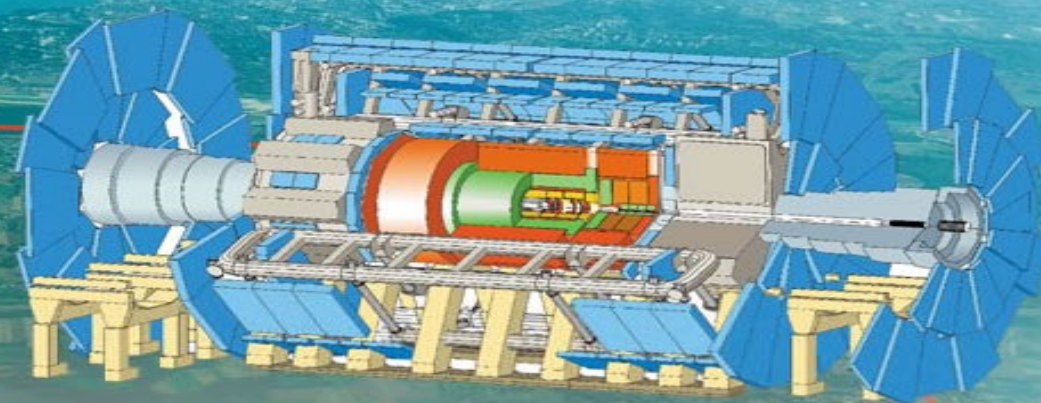




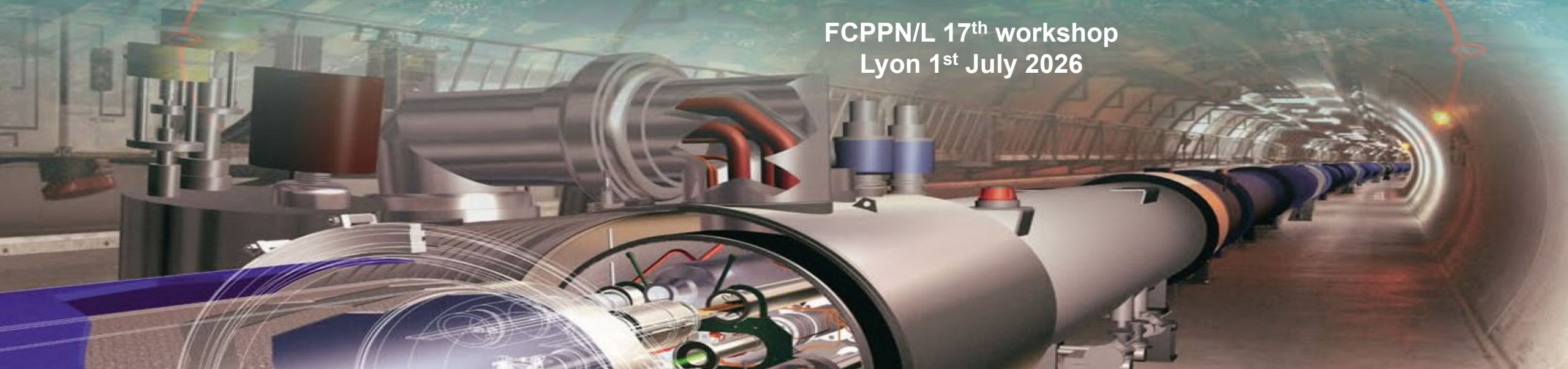
ATLAS FCPPN/L Projects Session Introduction

Emmanuel MONNIER (CPPM)

François Englert
18/06 @ 93years
Brout-Englert-Higgs
mechanism (BEH)



FCPPN/L 17th workshop
Lyon 1st July 2026

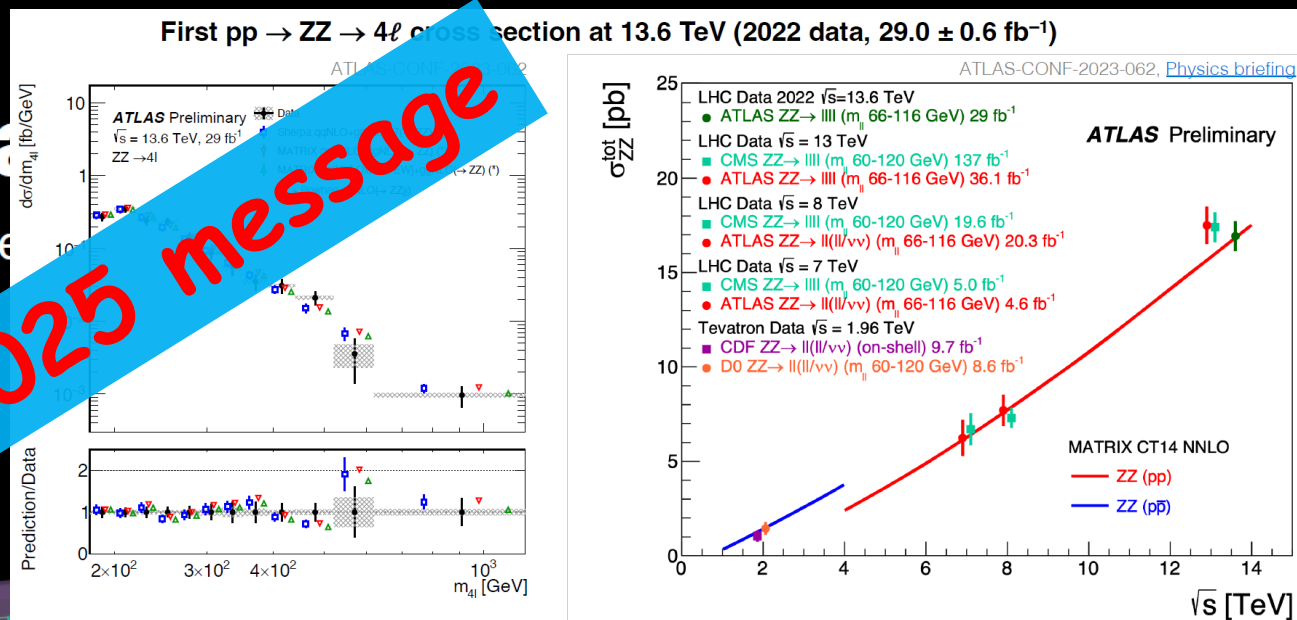


Run-3 data

Excellent detector and re

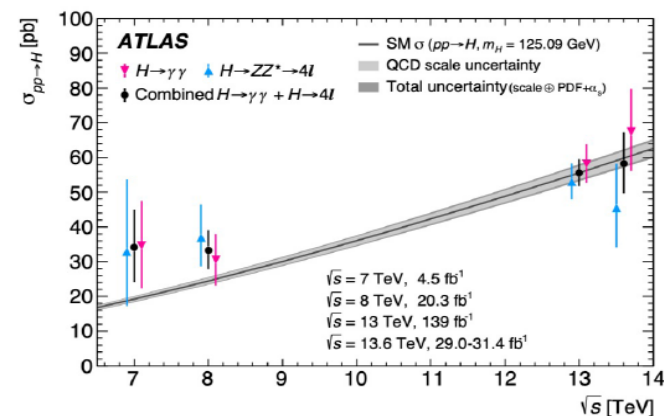
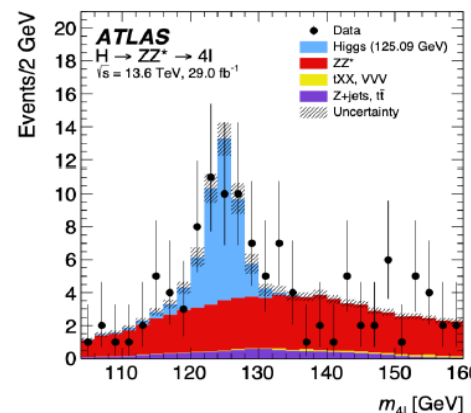
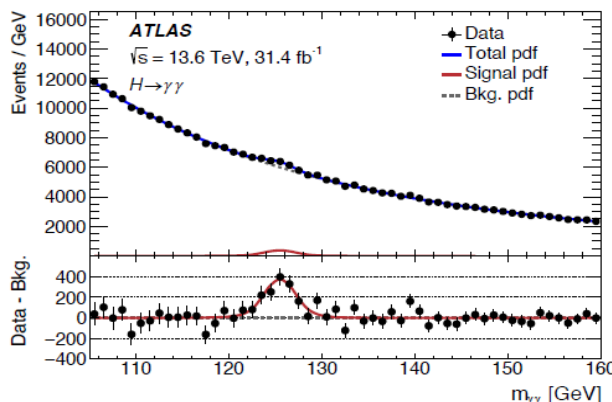
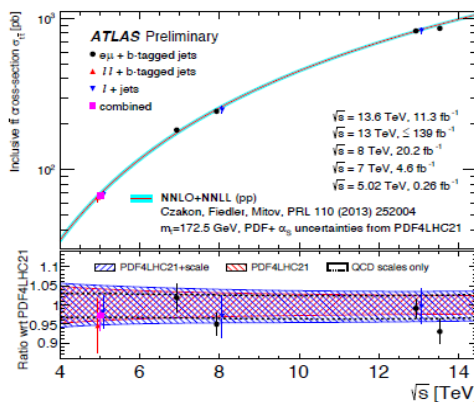


FCPPN/L 2025 message

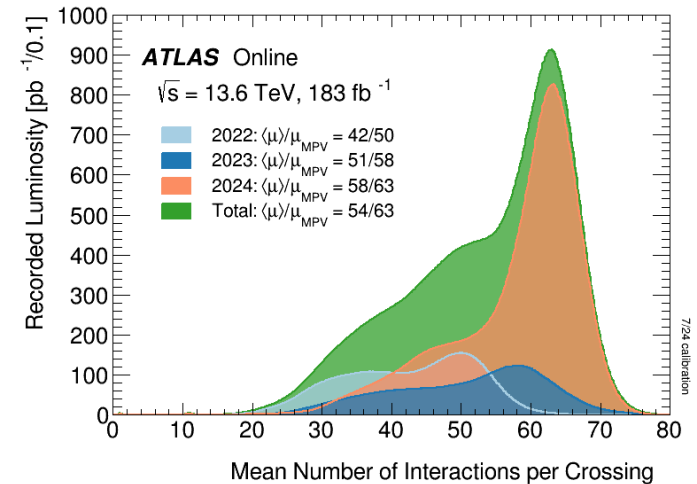
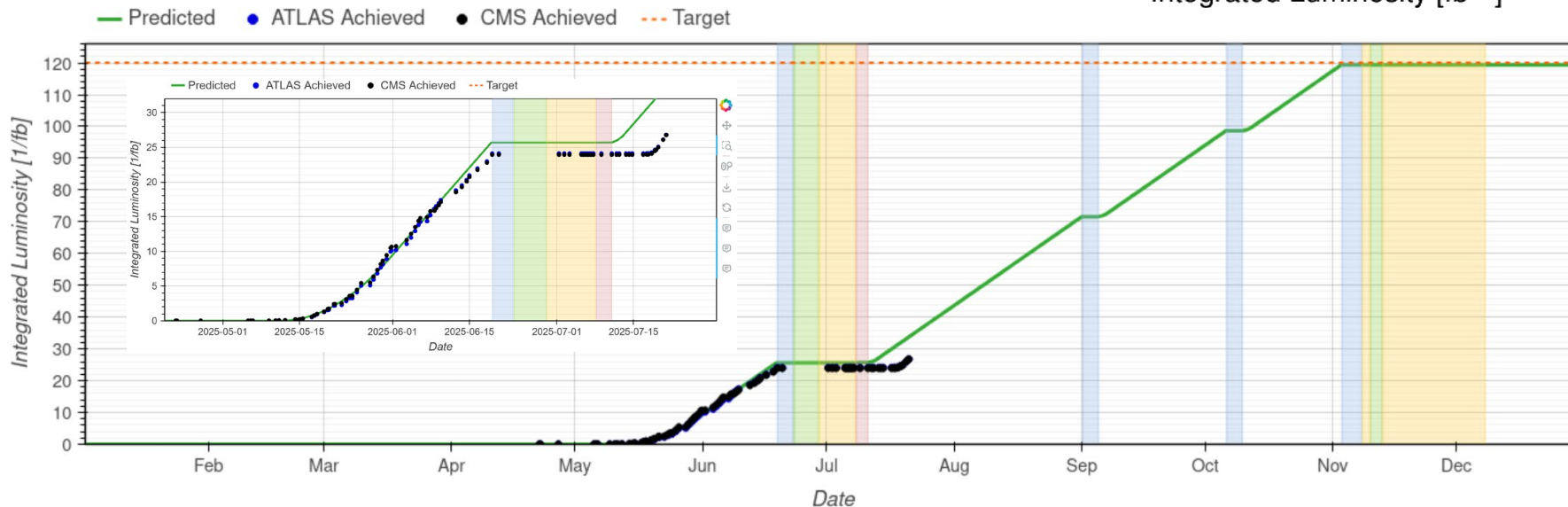
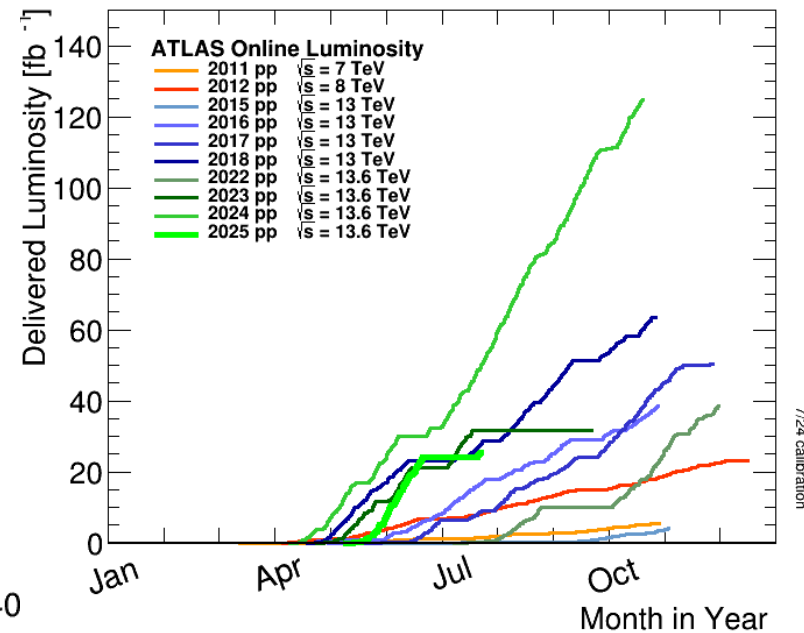
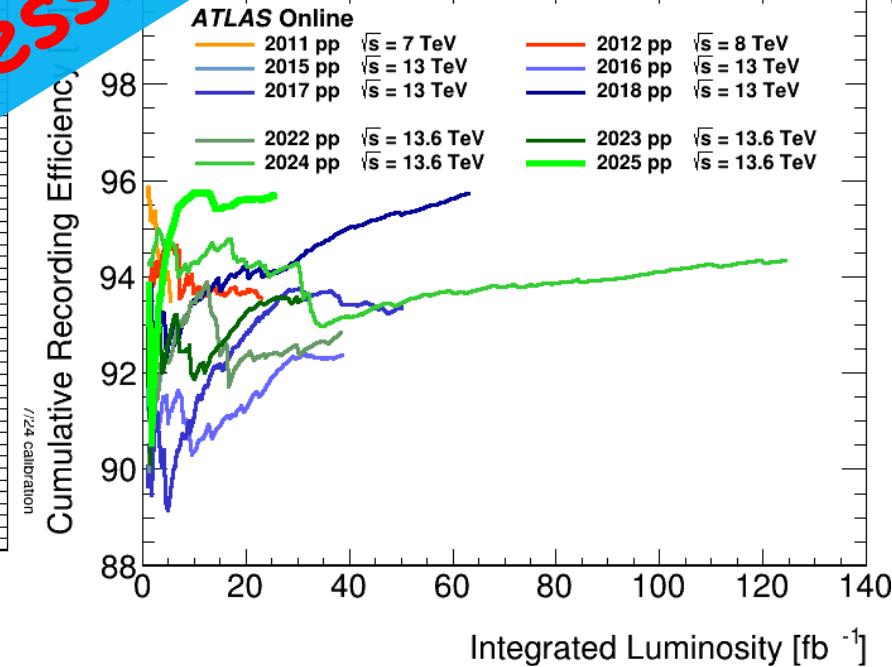
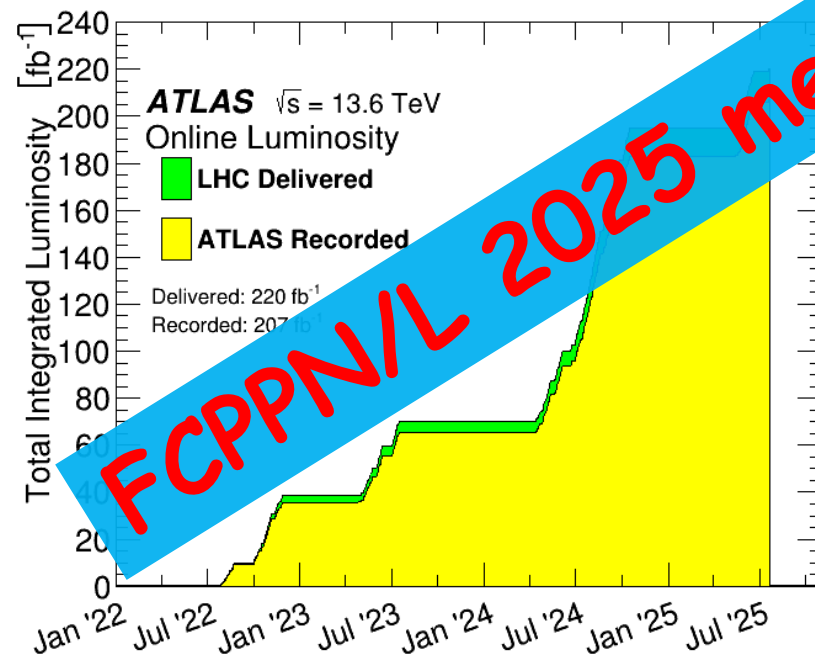


released on Run-3 data

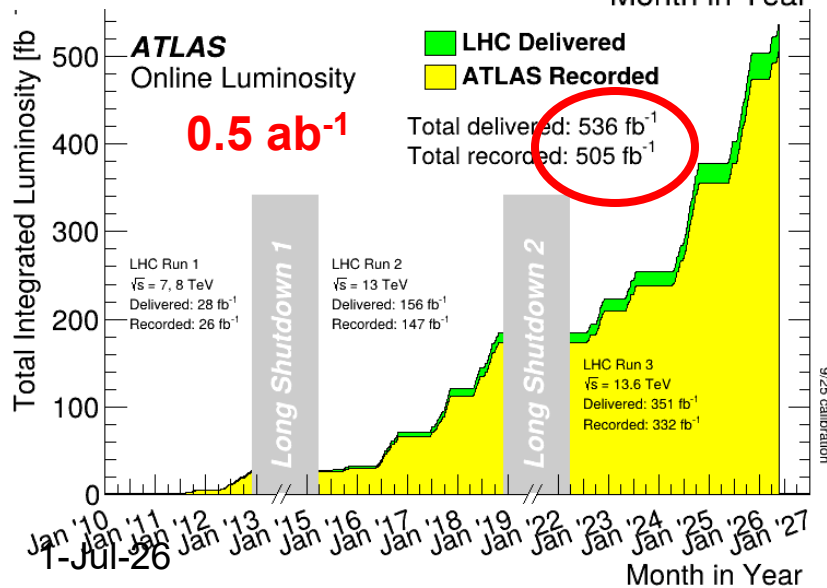
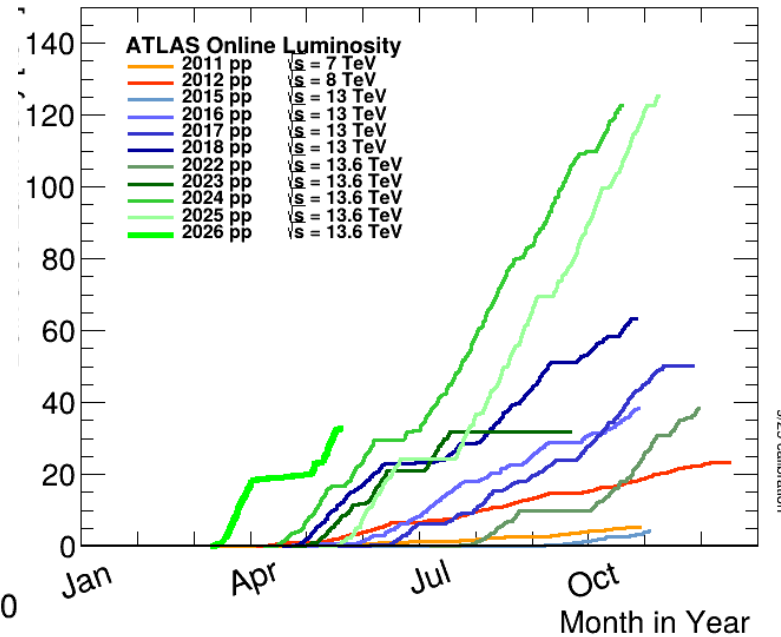
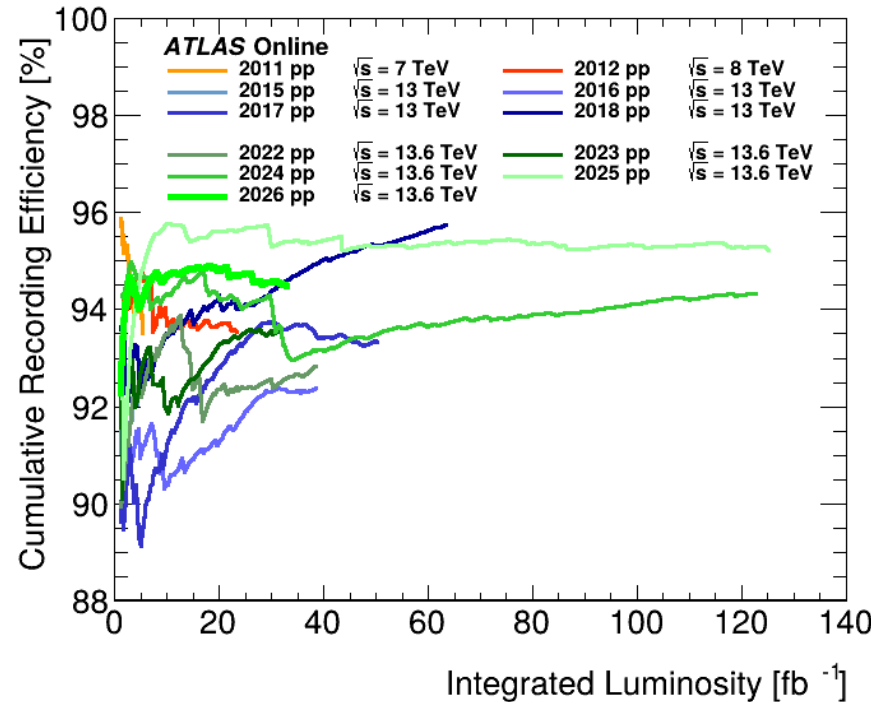
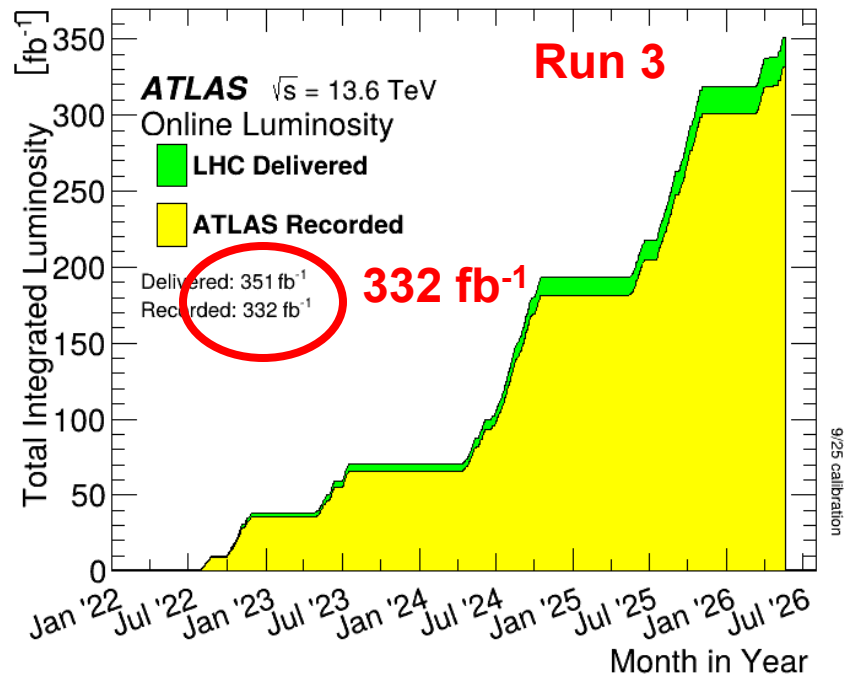
ATLAS well into Run3 in 2024 and now in 2025 !



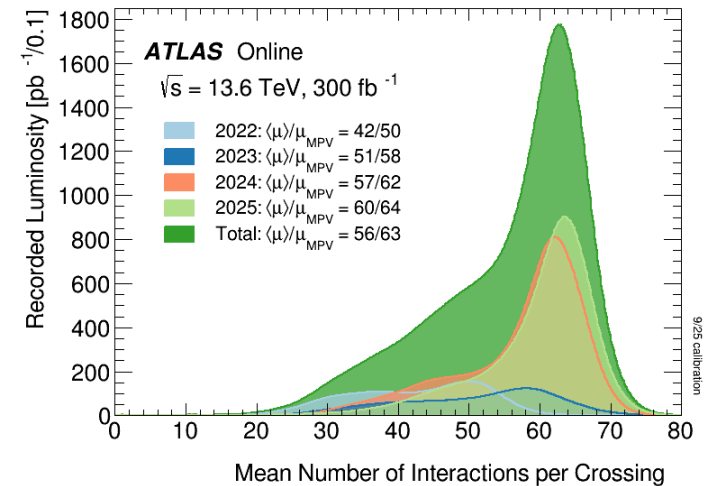
in 2022/2025 ATLAS >200 fb⁻¹ of pp Run 3 data !



Between 2022/2026 ATLAS got 332fb⁻¹ of pp Run3 data !

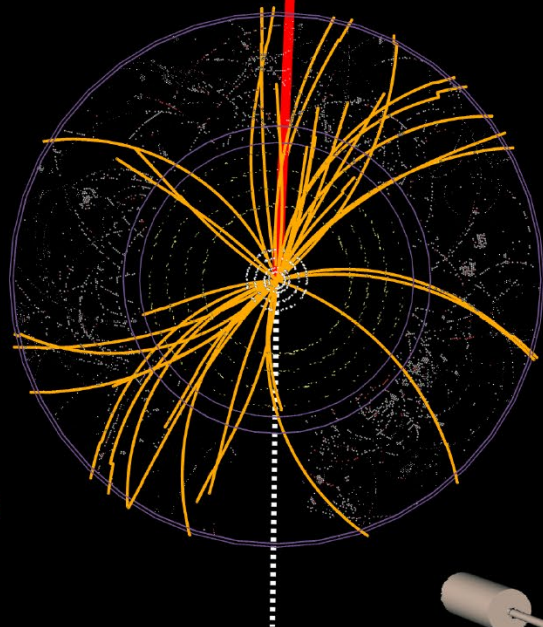


**Total Run123 = 0.5 fb⁻¹ !
@ 94% efficiency
+ 1.9fb⁻¹@96% low μ pp
+ 9.0fb⁻¹@96% PbPb
+ OO, pO, NeNe, VdM...**



Candidate
 $W \rightarrow \mu\nu$ event
recorded during
 $\mu = 3$ data taking

$m_T = 74$ GeV

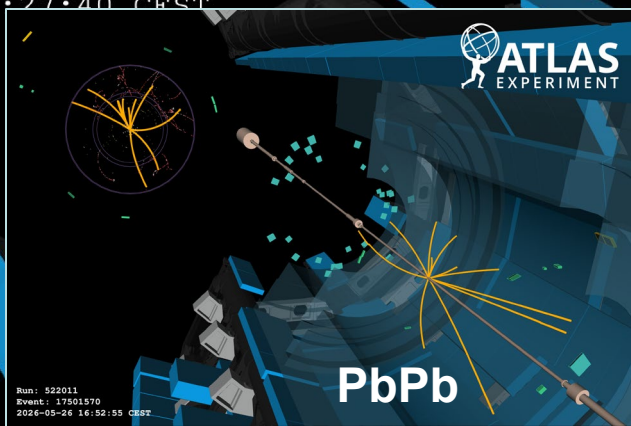


Run: 517520

Event: 4541637302

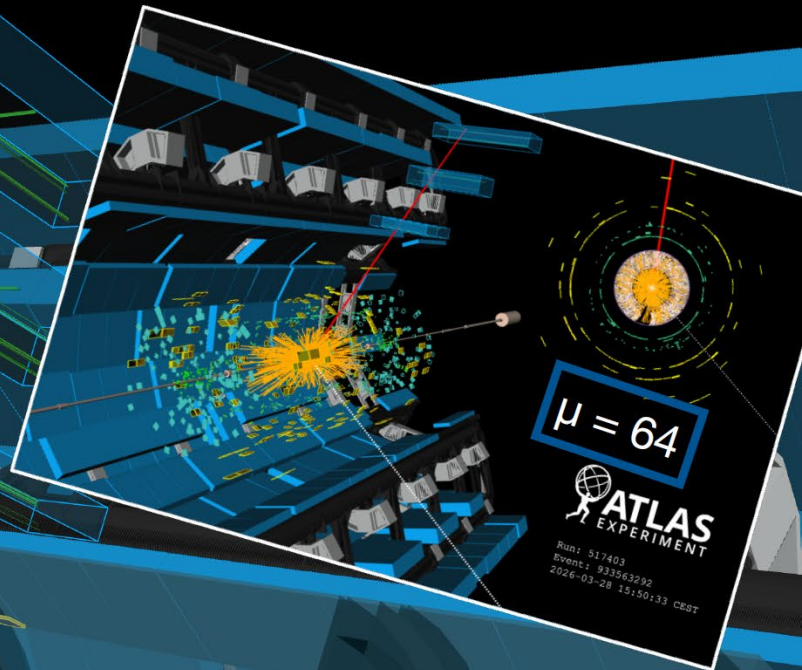
2026-03-31 05:27:40 CEST

Low- μ data taking
news item



PbPb

CPFN/L 2026



$\mu = 64$

ATLAS
EXPERIMENT

Run: 517403
Event: 933563292
2026-03-28 15:50:33 CEST

PROTON PHYSICS: STABLE BEAMS

Energy: 6799 GeV | B1: 2.78e+14 | B2: 2.75e+14

Beta* IP1: 0.60 / 0.18 m Beta* IP2: 10.00 m Beta* IP5: 0.18 / 0.60 m Beta* IP8: 2.00 m

Inst. Lumi [(ub.s)⁻¹] IP1: 19527.85 IP2: 8.49 IP5: 20150.65 IP8: 2101.39

FBCT Intensity and Beam Energy Updated: 03:55:58



Instantaneous Luminosity Updated: 03:56:01



Comments (20-Jul-2025 02:58:01)

STABLE BEAMS

IPs 2 & 8 on target

Roman pots IN

BIS status and SMP flags

B1 B2

Link Status of Beam Permits

true true

Global Beam Permit

true true

Setup Beam

false false

Beam Presence

true true

Moveable Devices Allowed In

true true

Stable Beams

true true

AFS: 25ns_2460b_2448_2089_2227_144bpi_20inj

PM Status B1

ENABLED

PM Status B2

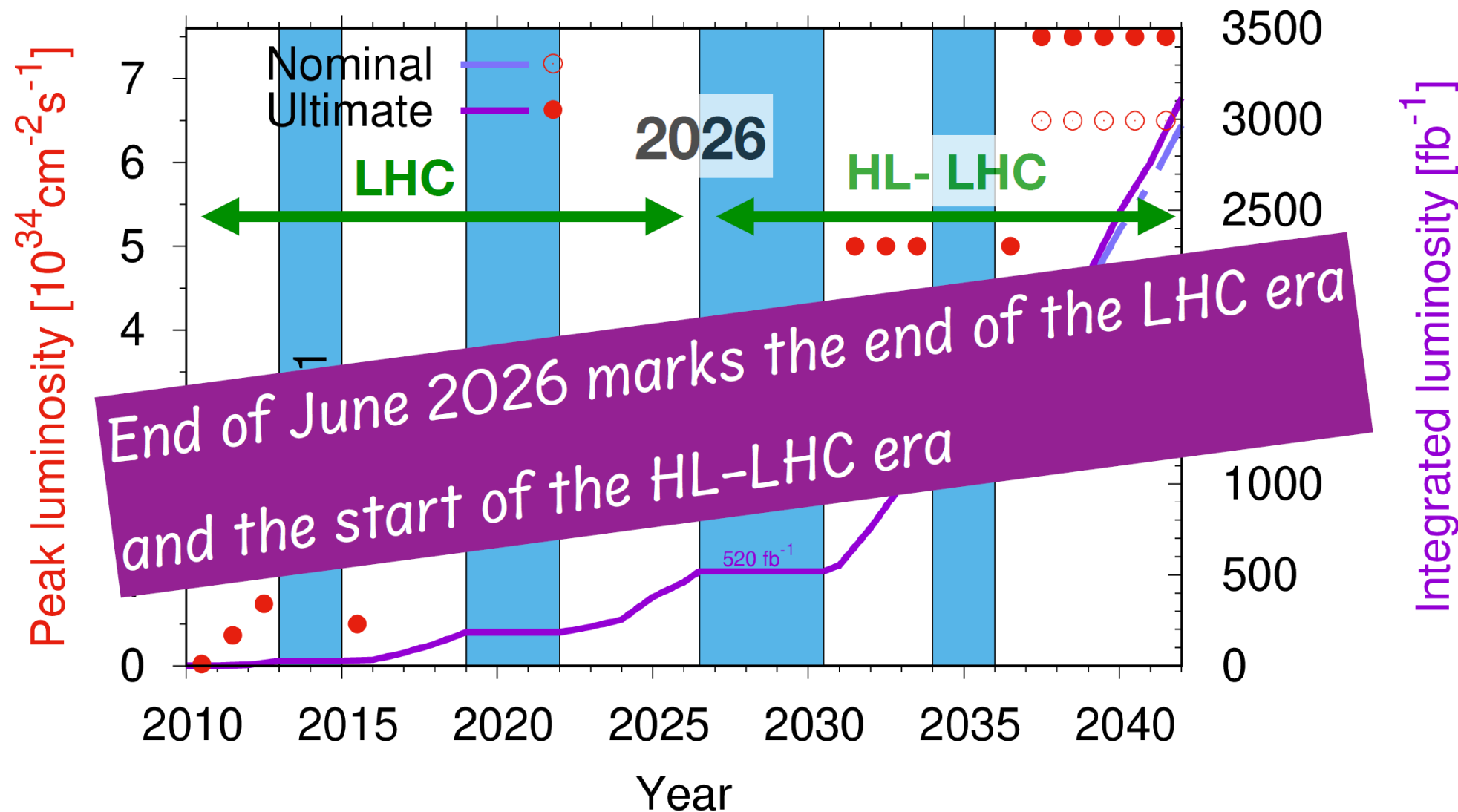
ENABLED

SHUTDOWN: NO BEAM

BIS status and SMP flags		B1	B2	
Comments (27-Jun-2026 05:52:15) So long LHC and thanks for all the collisions! Let's follow the road to HiLumi LHC	Link Status of Beam Permits	false	false	
	Global Beam Permit	false	false	
	Setup Beam	true	true	
	Beam Presence	false	false	
	Moveable Devices Allowed In	false	false	
	Stable Beams	false	false	
AFS: 25ns_1916b_1909_1042_1560_112bpi_20i8b4e	PM Status B1	ENABLED	PM Status B2	ENABLED

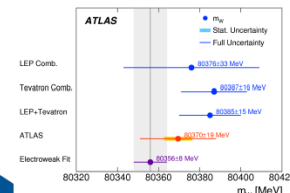
2026: A transition year

- 2026 marks end of LHC era and beginning of HL-LHC era: *on the road to 3 ab^{-1}*

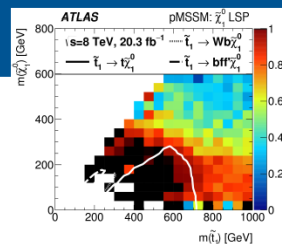
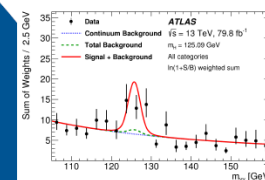


Transformative results (mostly from Run 1 & Run 2, so far...)

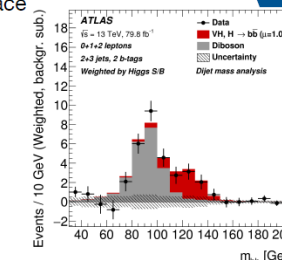
First W-boson mass at LHC



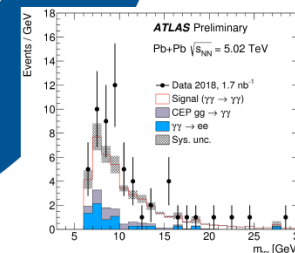
Observation of ttH



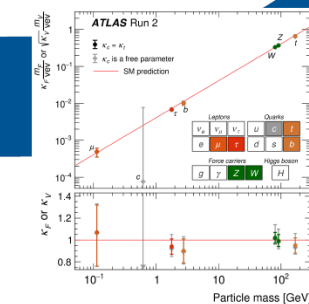
Probing SUSY parameter space



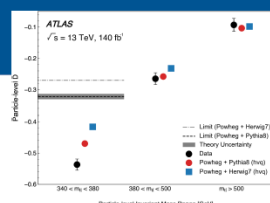
Observation of H to bb



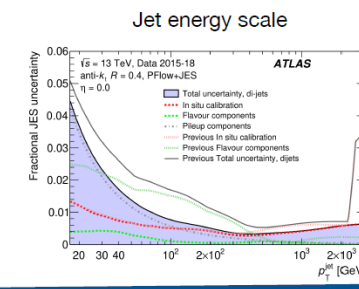
Observation of light-by-light scattering



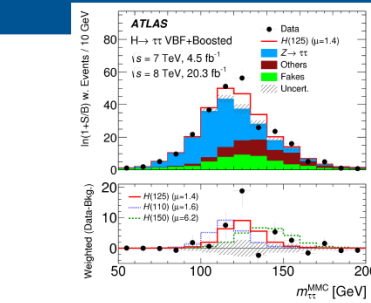
Higgs couplings



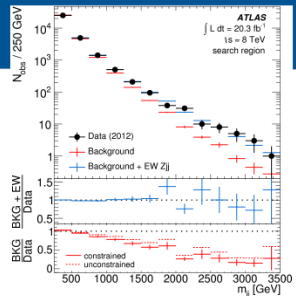
Observation of tt entanglement



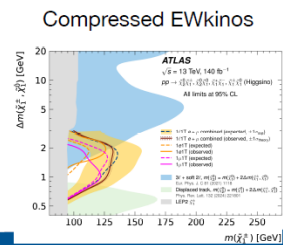
Jet energy scale



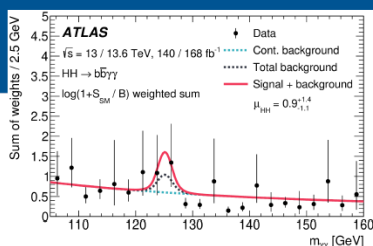
Higgs to $\tau\tau$ evidence



VBF Z-boson production

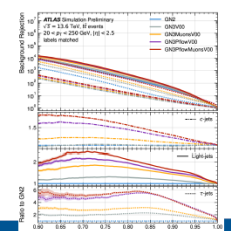


Compressed EWinos

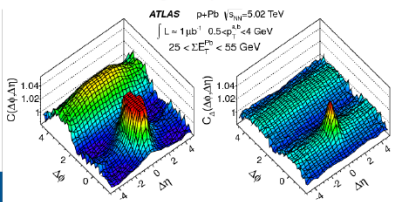


Higgs self-coupling via HH to bbyy

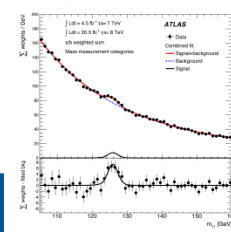
Flavor tagging w/ transformers



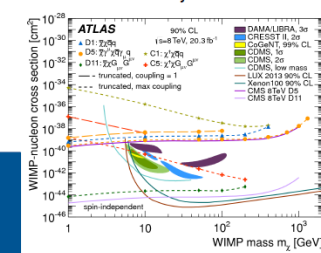
Double ridge in pPb collisions



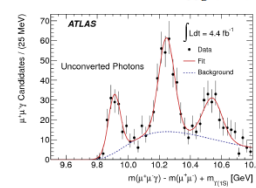
Higgs boson mass



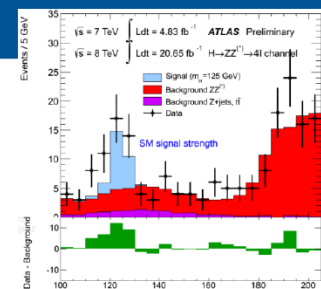
Dark matter search with monojet events



Observation of $\chi_b(3P)$

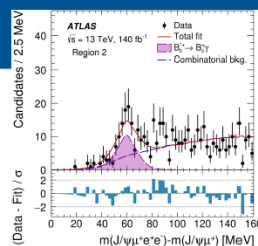


Higgs boson discovery



(a woefully incomplete set of highlights...)

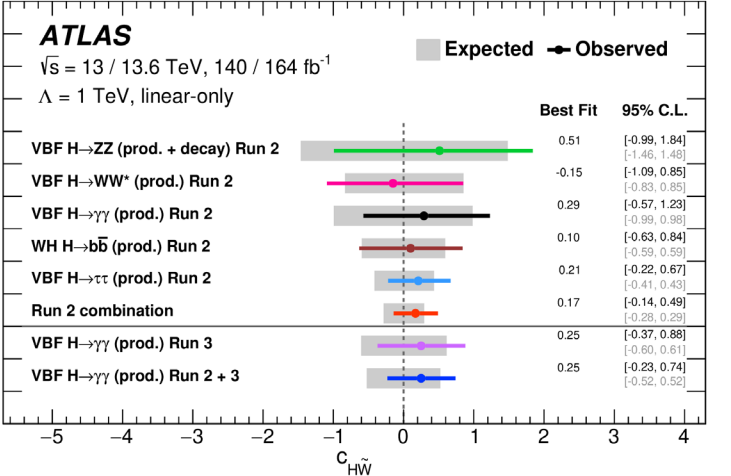
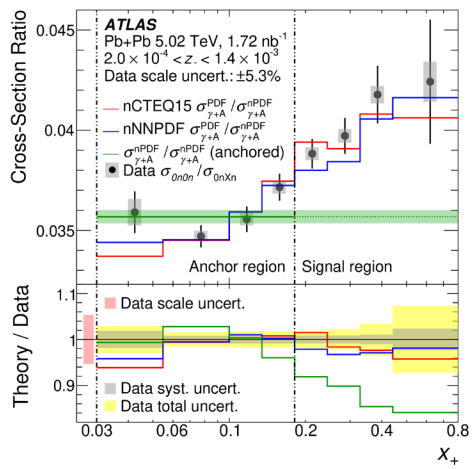
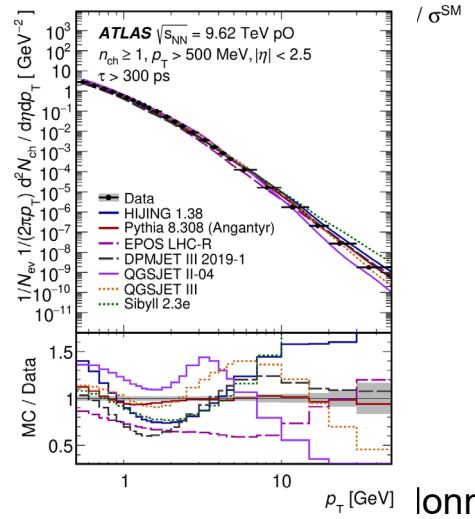
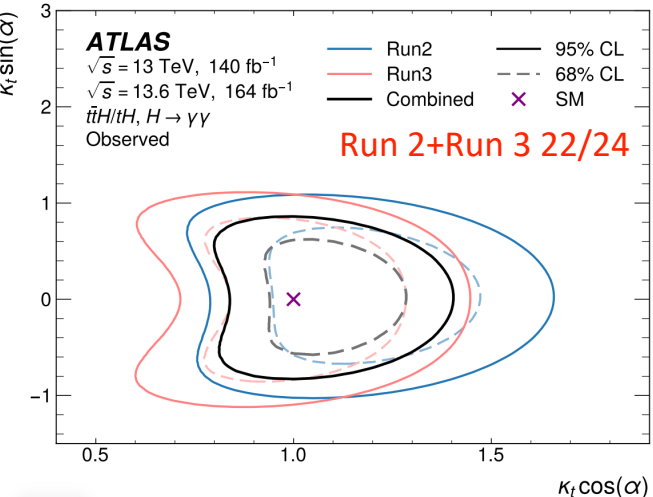
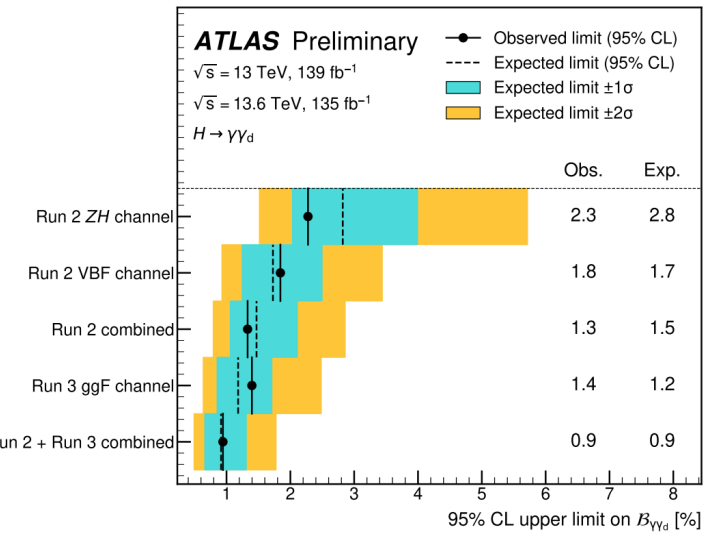
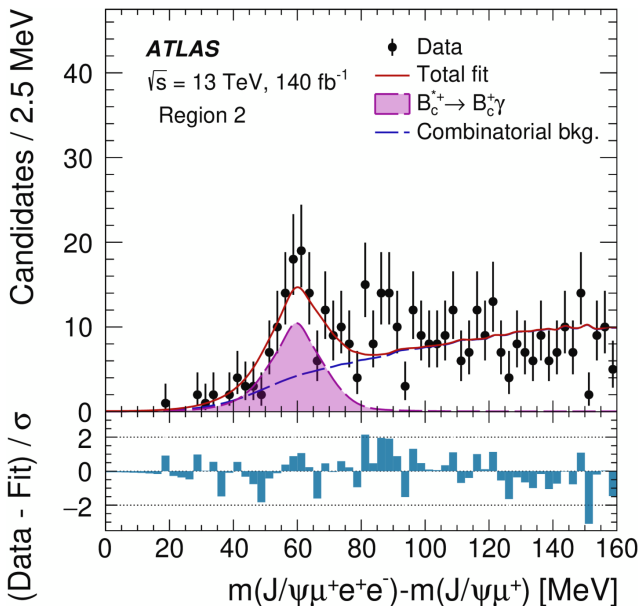
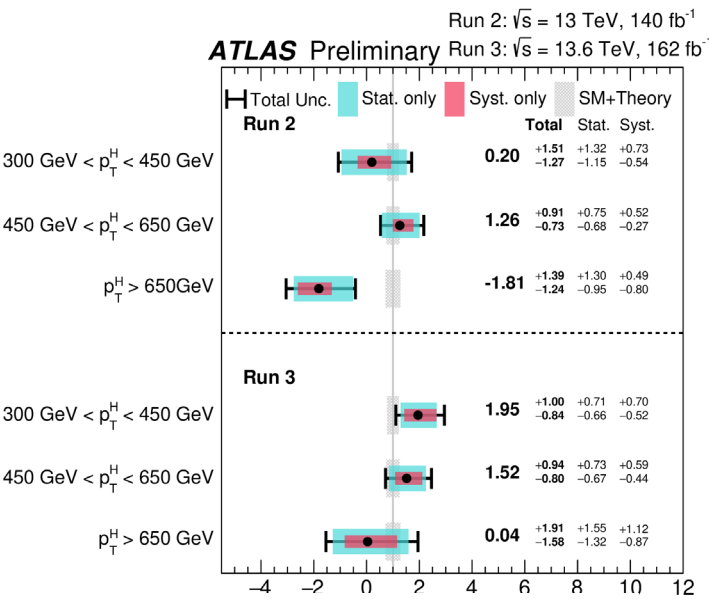
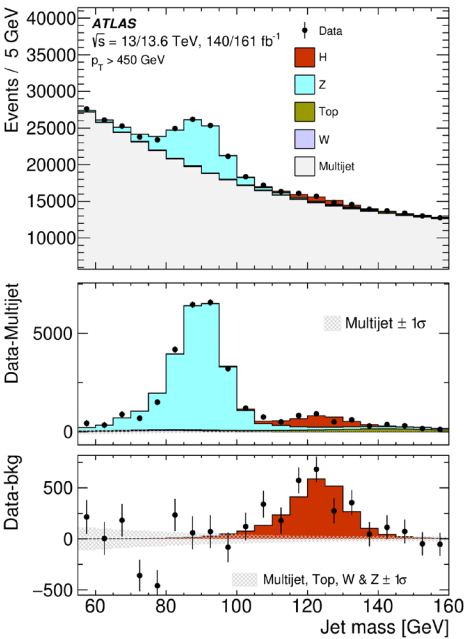
Observation of B_c^{*+}



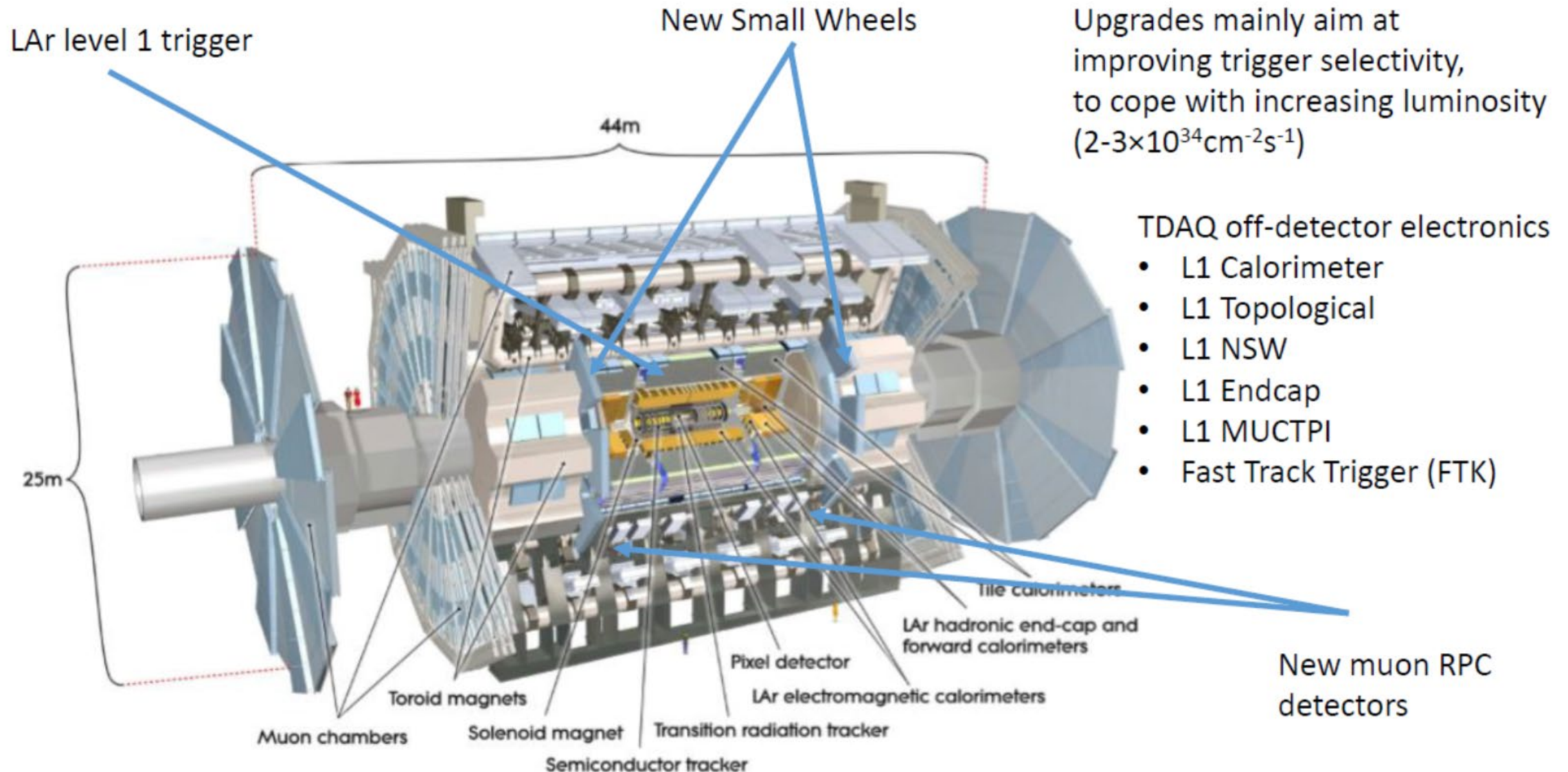
2010

2026

In 2025/2026 ATLAS continued Run 2/3 analysis !

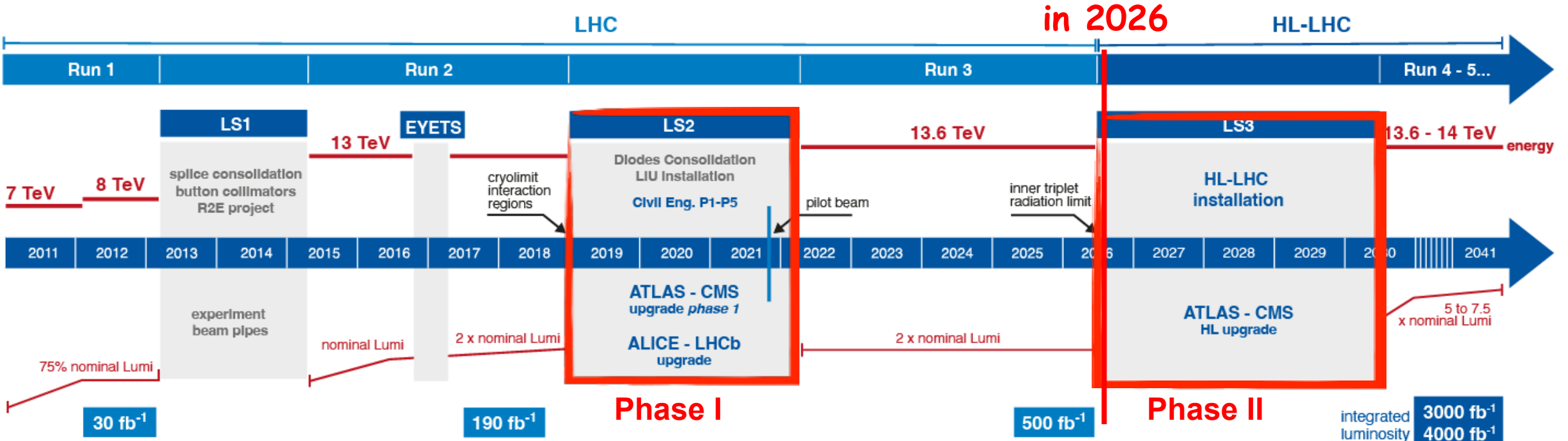


ATLAS Phase-I upgrades + Commissioning completed in 2024





LHC / HL-LHC Plan



HL-LHC TECHNICAL EQUIPMENT:

DESIGN STUDY



PROTOTYPING

HL-LHC CIVIL ENGINEERING:

DEFINITION

LS2: Phase-I Upgrade goals

- $\mathcal{L} \cong 3 \times 10^{34} \text{ cm}^{-2}\text{s}^{-1}$
- $\langle \mu \rangle \cong 80$
- Keep trigger (max) 100 kHz; latency $\leq 3 \mu\text{s}$

Upgrade of LAr trigger readout

LS3: Phase-II Upgrade goals

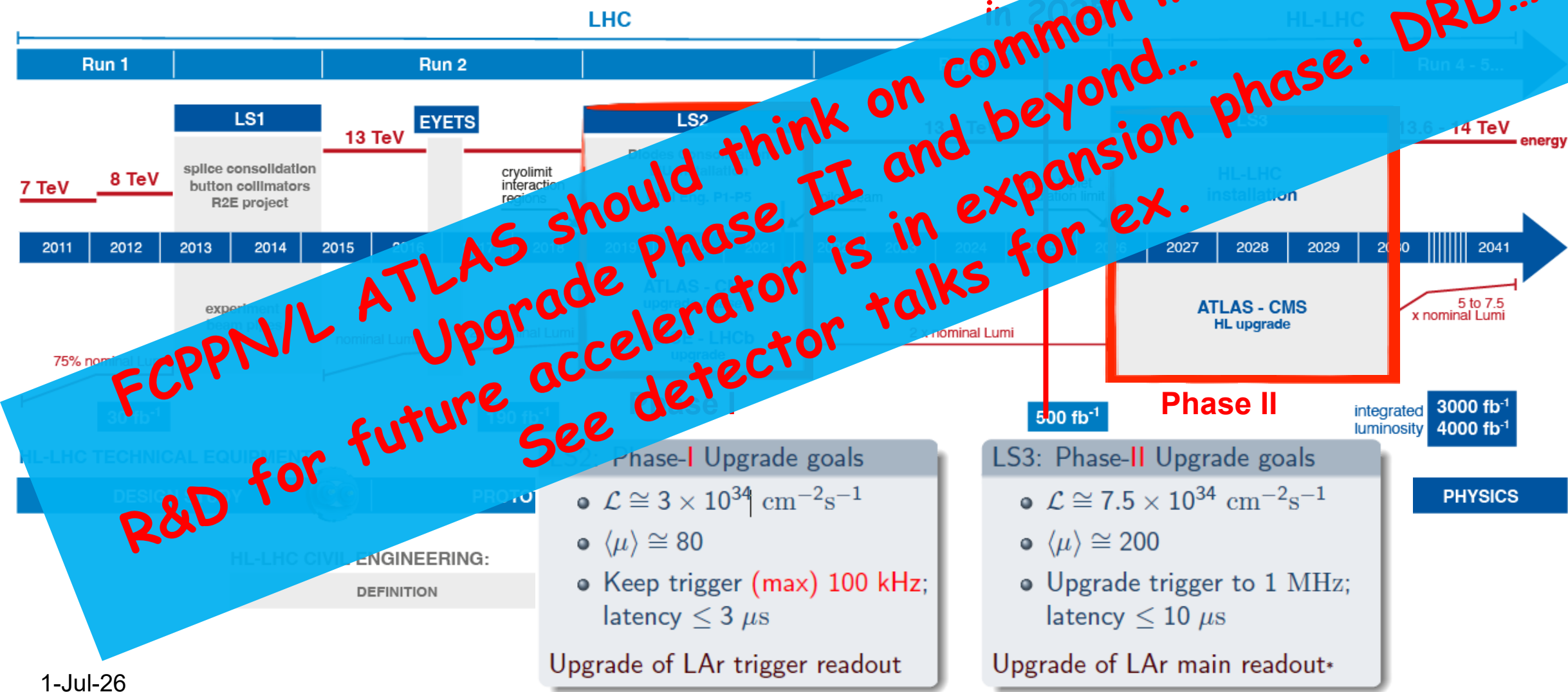
- $\mathcal{L} \cong 7.5 \times 10^{34} \text{ cm}^{-2}\text{s}^{-1}$
- $\langle \mu \rangle \cong 200$
- Upgrade trigger to 1 MHz; latency $\leq 10 \mu\text{s}$

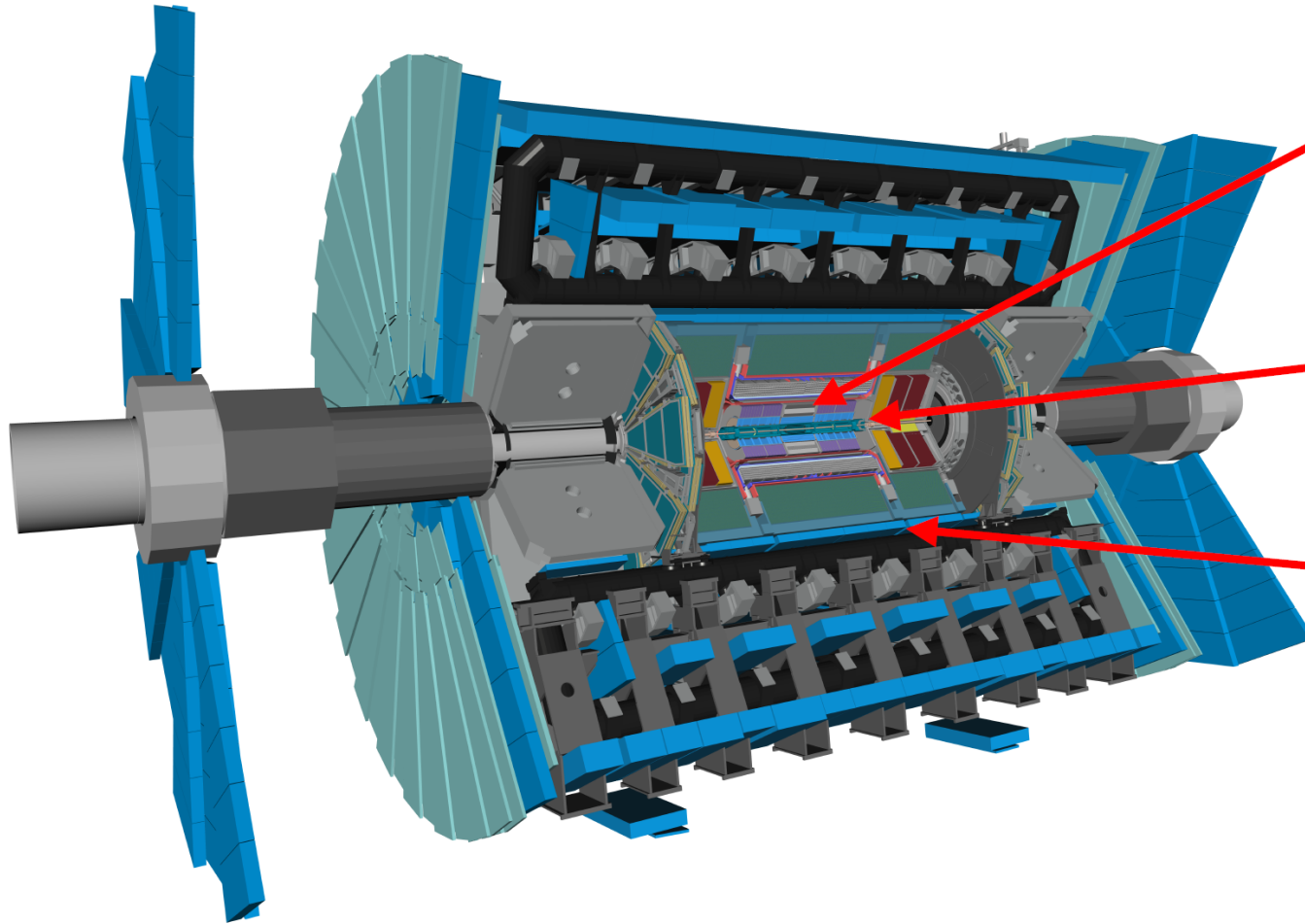
Upgrade of LAr main readout*

PHYSICS



LHC / HL-LHC Plan





New Inner Tracking Detector (ITk)

All silicon, up to $|\eta| = 4$

Two subsystems: Pixel (inner layers) and Strip

High granularity for pileup rejection:
 $25 \times 100 \mu\text{m}^2$ and $50 \times 50 \mu\text{m}^2$ pixels

High Granularity Timing Detector (HGTD)

Covering forward region ($2.4 < |\eta| < 4.0$)

Low-Gain Avalanche Detectors (LGAD)
Aiming at 30-50 ps track resolution

New Muon Chambers

Inner barrel region with new RPC (for trigger)
and sMDT (for precision measurement)

**Upgraded Forward (HL-ZDC) and new
Luminosity detectors** 1% luminosity goal

Electronics Upgrades

LAr Calorimeter

Tile Calorimeter

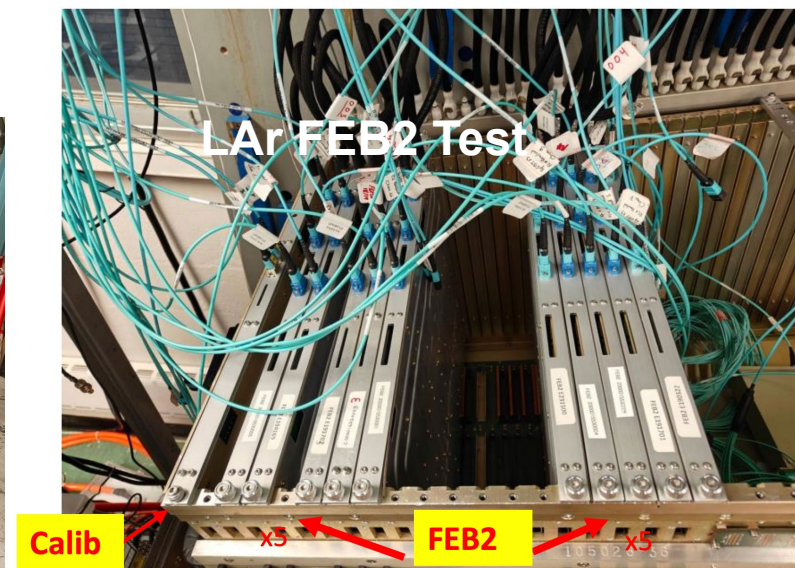
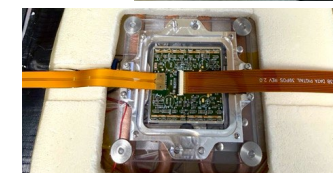
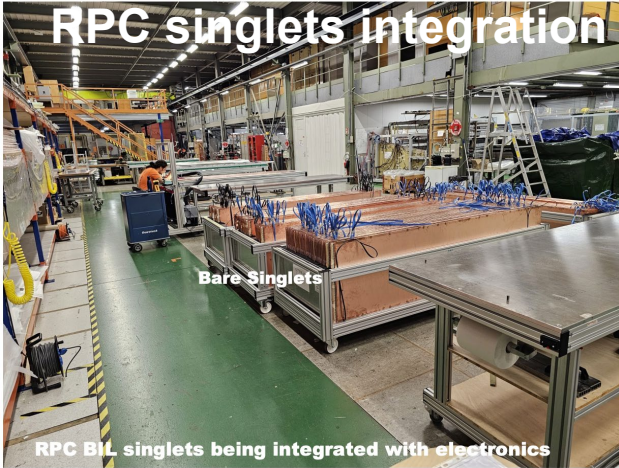
Muon Spectrometer

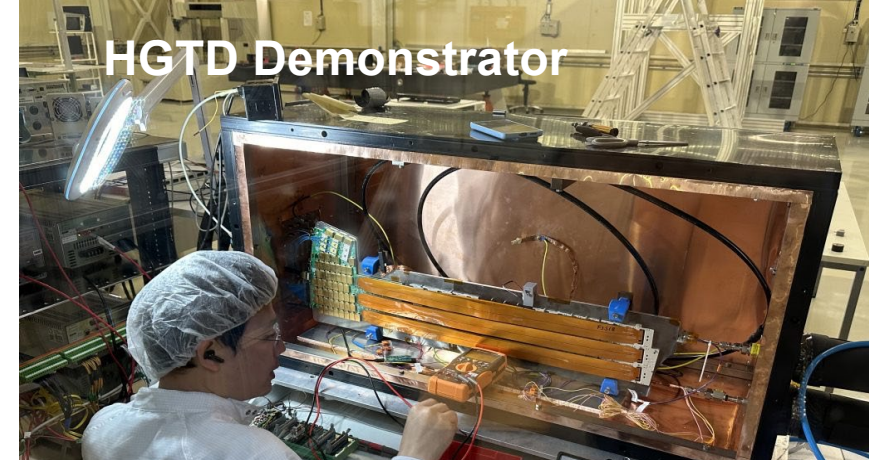
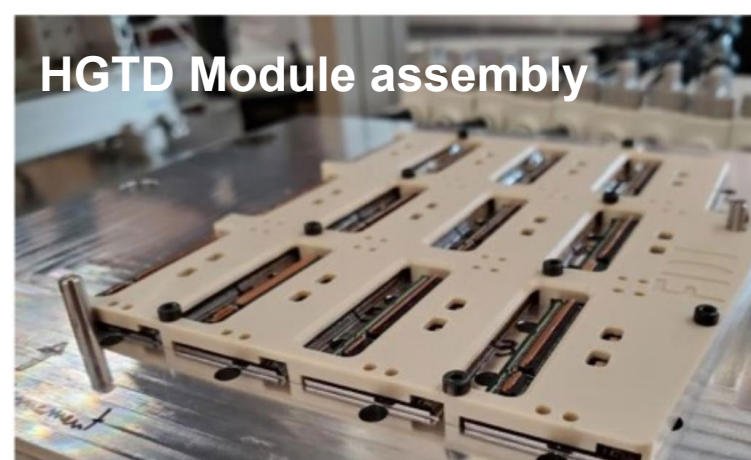
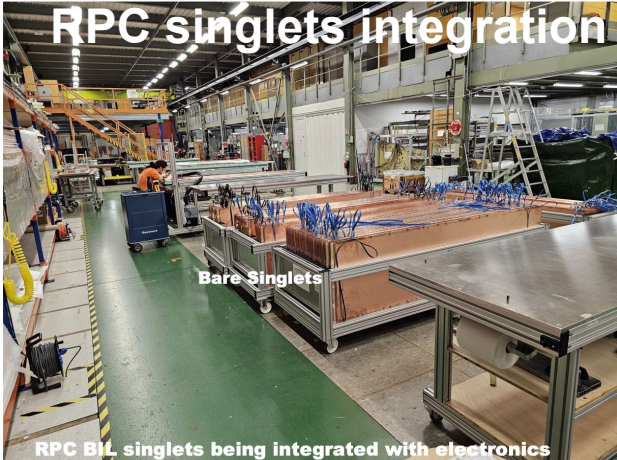
Upgraded Trigger & Data Acquisition

Higher rate first-level Trigger
(1 MHz $\rightarrow$ ~ 10 x higher than today)

Improved High-Level Trigger
(150 kHz full-scan tracking)

Upgraded Software & Computing





ATLAS is now in LS3 Upgrade Int./Installation at full swing !

FCPPN/L cooperation strongly contributes to many "Run 2" legacy papers as well as now to the "Run 3" and combined R2&3 data analysis.

See today's talks as well as winter and summer conference slides and related conf. notes for ATLAS new results.

ATLAS Upgrade Phase II is in full swing and FCPPN/L is strongly involved!

AND:

ATLAS FCPPN/L has opportunities to further cooperate: ITK, LAr Calo, HGTD,...

BUT: also in the emerging future detector R&D DRD program for ex...

AND FCPPN/L cooperations have a role to play in it !

Future R&D program, DRDs, Allegro, Allegro calo...

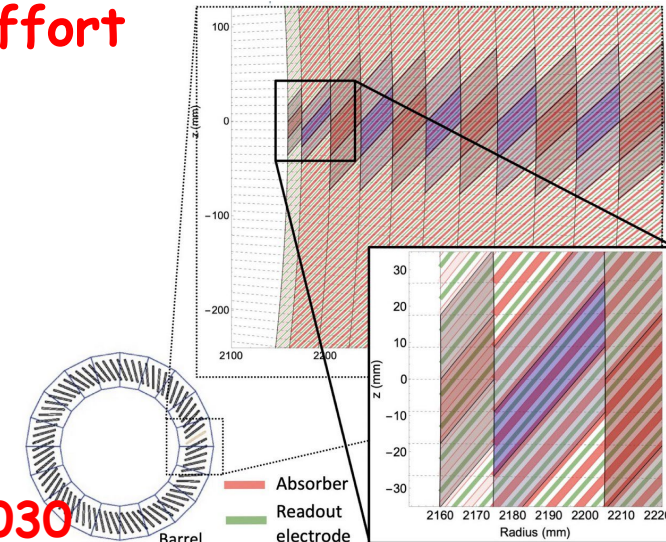
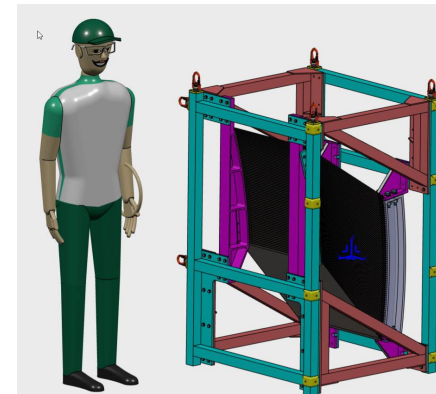
- Right time to take part to these huge R&D (DRD) effort ramping up for next e^+e^- colliders
- Many activities in many field, (see talks in the detector sections)
- Long standing cooperation between China and France on ATLAS physics and on detector performance such as electron and photon Reco&ID and LAr calorimeter with many co-PhDs.
- Now time to plan for future EM calorimeter ! And start the R&D effort
- Detector concept ALLEGRO [Web site](#)



- Still in early design phase
- Design centred around High granularity **Noble Liquid ECAL**
 - Pb+LAr (or denser W+LKr)
- Si VXD
- Tracker: Drift chamber, straws, or Si
- Steel-scintillator HCAL
- Coil outside ECAL in same cryostat
- Muon system

Eur.Phys.J.Plus 136 (2021) 10, 1066, [arXiv:2109.00391](#)

Proto in 2029/2030



- Strong cooperation program between the Atlas Chinese Clusters and IN2P3 labs since many years:
 - Higgs, Susy studies, SM (through $\gamma\gamma$, WW final states and also lepton/jet/bjet/top final states such as in 4t, ttH, VH, H^{++} , HH, SH...)
(F. Déliot, T. Fournier talk)
 - Performance studies (E/gamma, b tag, trigger, calorimeter)
 - Commissioning & operation for Run3 (Several FCPPN/L PhD students)
 - Silicon detector R&D and Phase II and future R&D (P. Breugnon, D. Xu,...)
 - Numerous presentation in Atlas meetings, conferences as well as in internal, public/conf notes and publications. (See FCPPN/L reports)
 - Senior physicists visits (France and China) slowly restarted and cooperation work between physicists continue.
 - Several co-PhD thesis defended recently and more to come... (Co-PhDs important strengthening force for the FCPPN/L)
- On computing/AI/Data preservation, IHEP/IN2P3/CEA (C. Diaconu, AI session...)
- Phase II (HGTD, ITK, LAr...) & new accel. coop. started (J. Luo,...).

ATLAS ACC-IN2P3 continued full Run2 & Run3 data analyses & performance studies

- PhD:
 - X. Yang (LPSC/SDU) CSC funded (defended 06/20)
 - Y. Wang (LPNHE/USTC) USTC funded (defended 12/20)
 - H. Atmani (IJCLAB) IJCLAB funded (defended 12/20)
 - H. Xu (CPPM/USTC) CPPM/USTC funded (defended 09/21)
 - Z. Li (CPPM/SDU) CPPM/SDU/CSC funded (defended 09/21)
 - K. Han (IJCLAB/USTC) USTC funded (defended 03/22)
 - C. Wang (CPPM/SJTU) CPPM/SJTU/CSC funded (defended 02/23)
 - J. Tafoya (IJCLAB) IJCLAB funded (defended 10/23)
 - Y. Zhang (APC/SJTU) APC/SJTU/CSC funded (defended 12/23)
 - X. Su (IJCLAB) IJCLAB/USTC funded (defended 10/24)
 - Q. Shen (APC/SJTU) APC/SJTU/CSC funded (defended 11/24)
 - X. Wang (CPPM/SJTU) CPPM/SJTU/CSC funded (defended 11/24)
 - C. Mo (APC/SJTU) APC/SJTU/CSC funded (started 10/23)
 - D. Yu (APC/SJTU) APC/SJTU/CSC funded (started 25)
 - J. Luo (CPPM/IHEP) CPPM/IHEP/CSC funded (started 25)
- Many former Co-PhDs now postdocs or permanent positions: Core for future Accelerator Prog
- HL-LHC (Calo, ITK, HGTD...) & future accelerator (Silicon detector, Calo...) cooperation program ongoing, but need new PhD students & short stay scientists to strengthen it !
- Need to strengthen person power/funds for strong ATLAS Run 2/Run 3 analysis, ATLAS upgrade and future detectors R&D to foster the future accelerator program.

谢谢！
Merci !
Thank You !

11:00

Introduction to the ATLAS projects

Emmanuel Monnier

IP2I, Campus scientifique de la Doua

11:15 - 11:30

Highlight on recent ATLAS Results

Haijun Yang



IP2I, Campus scientifique de la Doua

11:30 - 12:00

12:00

Report on the CEA/SJTU project

Frédéric Déliot

IP2I, Campus scientifique de la Doua

12:00 - 12:20

Report on the APC/SJTU

Mr Tom FOURNIER et al.



IP2I, Campus scientifique de la Doua

12:20 - 12:40

Simulation of Noble Liquid Calorimeter performances (CPPM/IHEP)

Jiashun Luo

IP2I, Campus scientifique de la Doua

12:40 - 13:00

Cooperation on noble liquid calorimeter

- Work has also started at CPPM on prototype design and detector simulation, collaborators welcome, one IHEP student already working with us.
- A lot need to be done on many front to get a **prototype by 2029/2030** (post LS3)
- This ALLEGRO calorimeter is of interest for everyone:
 - Master a critical type of detector for future collider experiments
 - Demonstrate expected performances for future experiment design
 - Noble liquid EM calorimeter very appealing solution for future colliders
 - Fulfill all requirements of the physics program & Cost effective
- **Very active ALLEGRO ECAL R&D widely open to new collaborators !**
 - detector design, absorbers, spacers, electrodes, cold electronic readout, optical transmitters, back end electronic, feedthrough, carbon fiber cryostat, daq...
- **Cooperation between Chinese and French groups can foster & strengthen this effort**
- **Contact & interest have already started with several Chinese institutes**
 - Can start with co-supervised PhD and a few seniors

