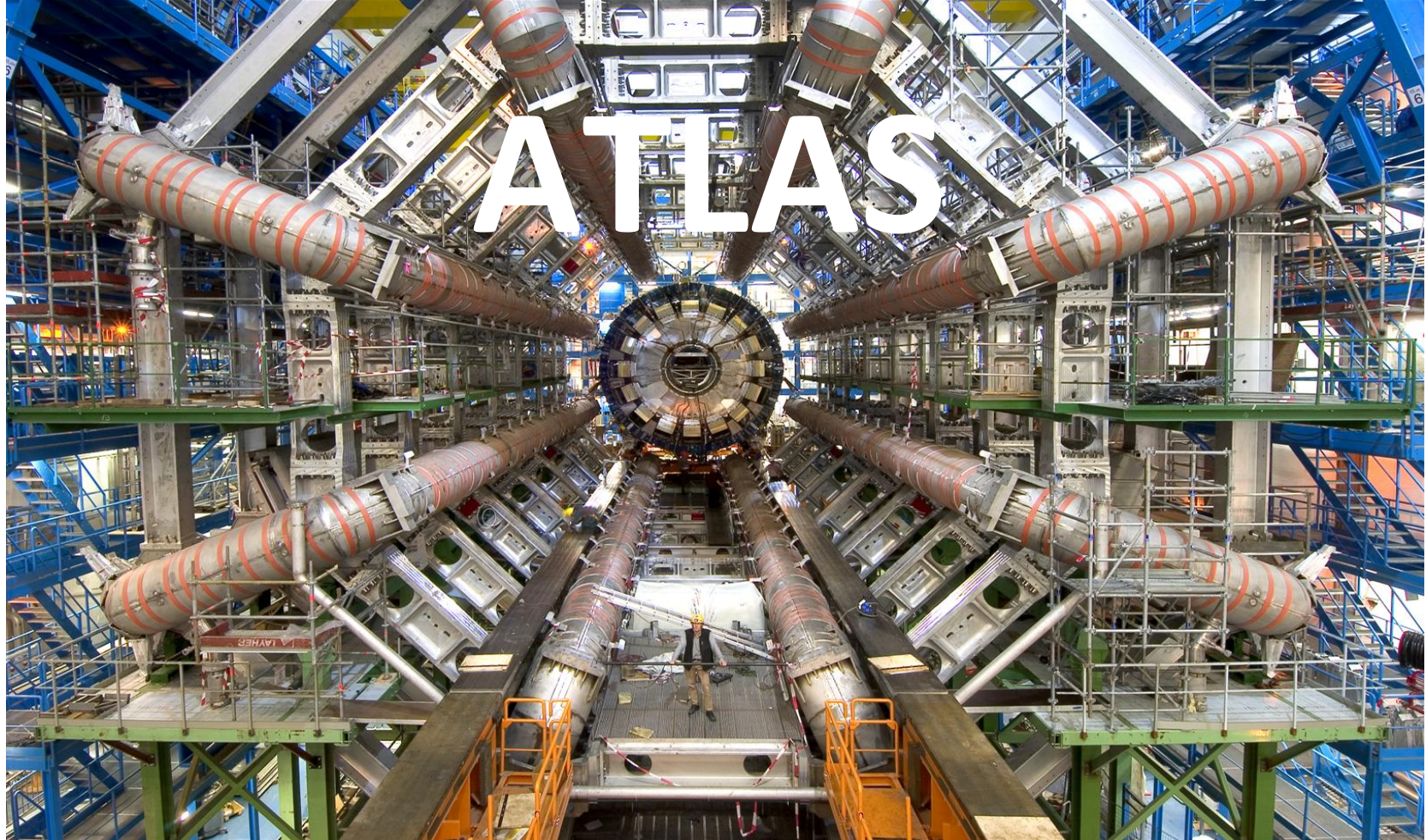




ATLAS

M. CENTONZE, G. CHIODINI, E.M.V. FASANELLI, G. FIORE, A. FORTE, E. GORINI, F.G. GRAVILI, M. GRECO, A. INNOCENTE, A. MICCOLI, A. PALAZZO, M. PEPE, M. PRIMAVERA, F. RICCIARDI, E.J. SCHIOPPA, S. SPAGNOLO, A. VENTURA

TESISTI TRIENNALI/MAGISTRALI: F. DE SANTIS, L. RUSSO

SEE G. CHIODINI'S SLIDES FOR ATLAS-ITK CONTRIBUTORS AND ACTIVITIES!

ATLAS STATUS AND HIGHLIGHTS (2020-2021)

ATLAS points of highest attention on 1 slide

LS2 and Phase-I upgrade

- NSW A+C completion and commissioning
- LAr + L1Calo (+ full TDAQ) upgrade completion, integration and commissioning

Software, Data preparation, Trigger

- Complete validation and tuning of release 22, and start of Run-2 data and MC reprocessing soon
- Rich, ambitious and optimised L1 & HLT trigger menu for Run 3 (“ATLAS physics of this decade”)

Phase-II Upgrade I'll not give details on Phase-II

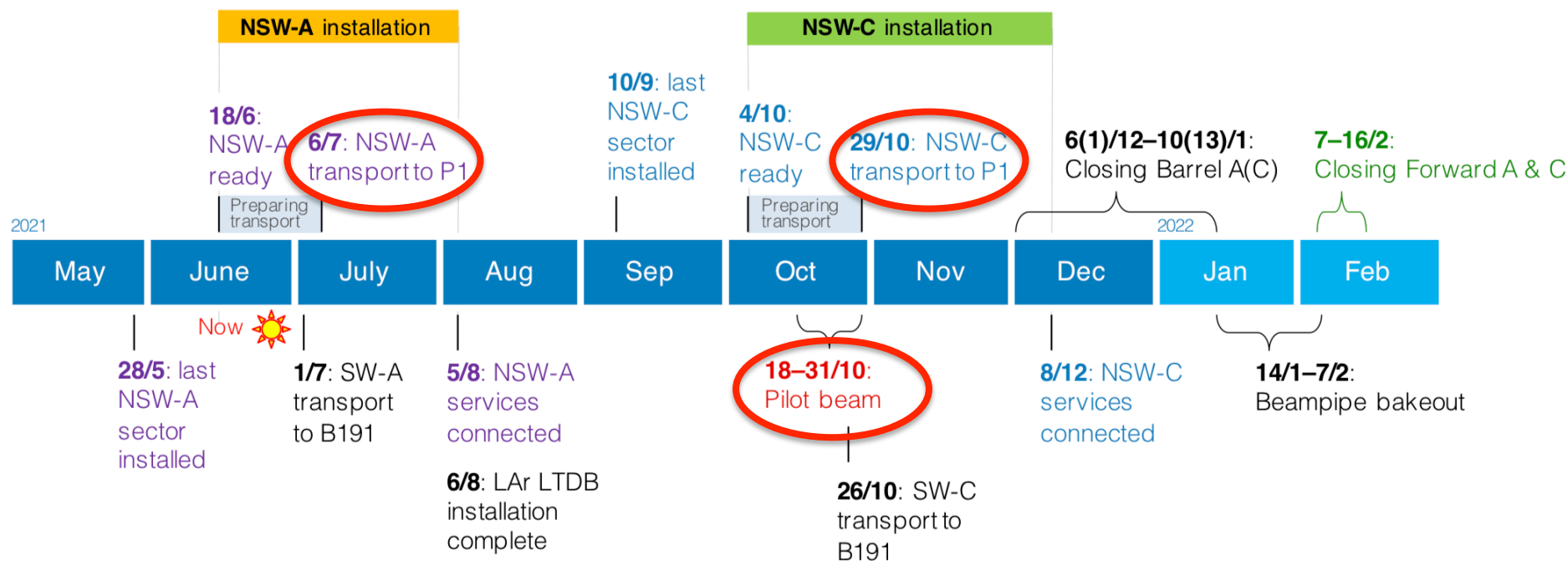
- Halt schedule slippage, complete final design (in particular of ASICs) and prepare for production
- Consolidate LS3 planning in view of COVID and technical delays

-
- LS2 work progressing well for all systems; many milestones achieved, commissioning of systems ongoing
-  **New Small Wheel (NSW) remains schedule driver, but huge progress made since Feb ATLAS Week**
- **ATLAS decided on May 17, after a detailed review, to go ahead with the installation of the NSW**

25 Giugno
2021:
The NSW-
A on the
transport
structure



Simplified LS2 schedule

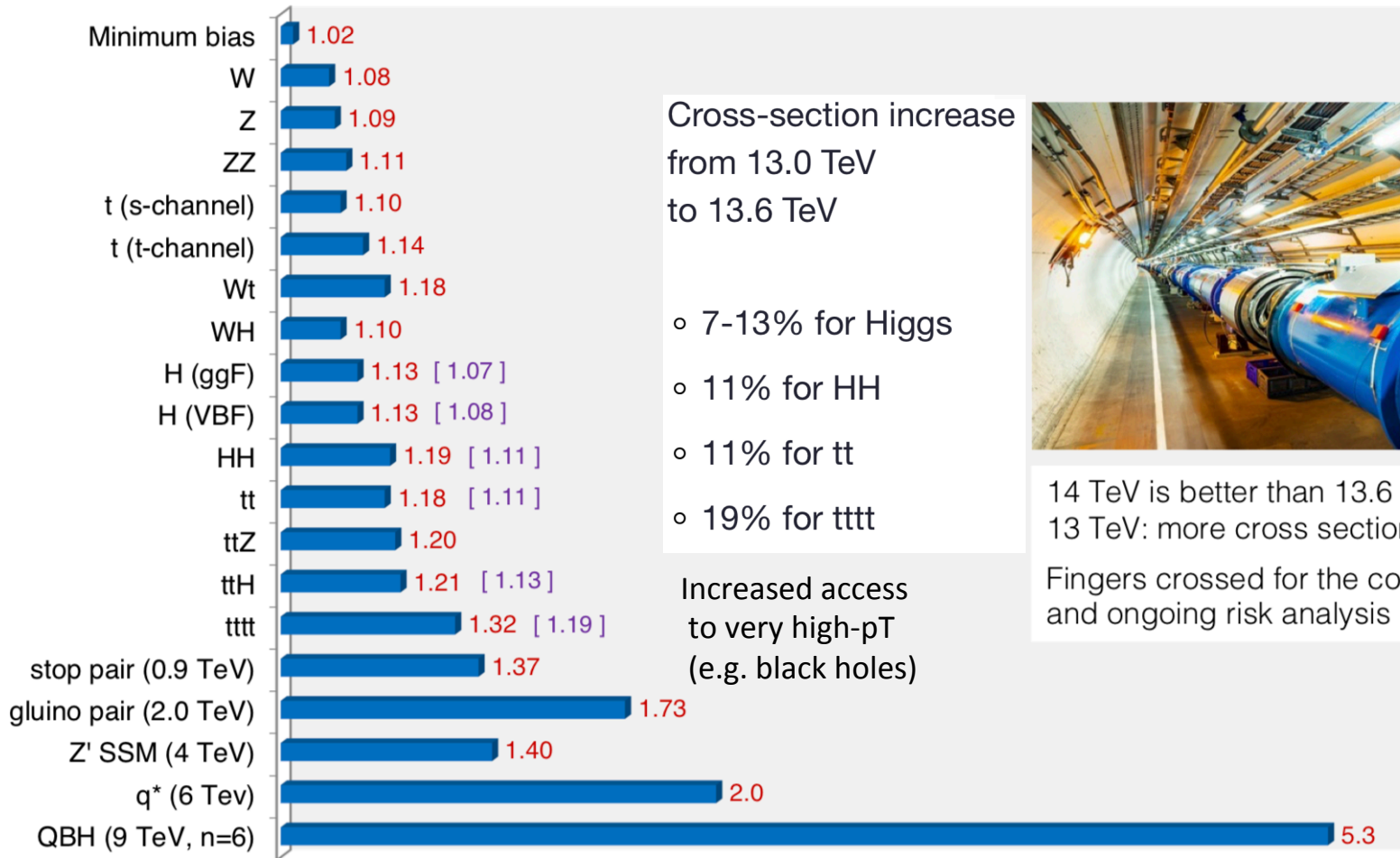


ATLAS expected ready-date: 17 Feb 2022

June 7th LHC agreed ready-date: 21 Feb 2022 → Start of intensity ramp ~mid to end May 2022

Centre-of-mass energy — opportunity for Run 3

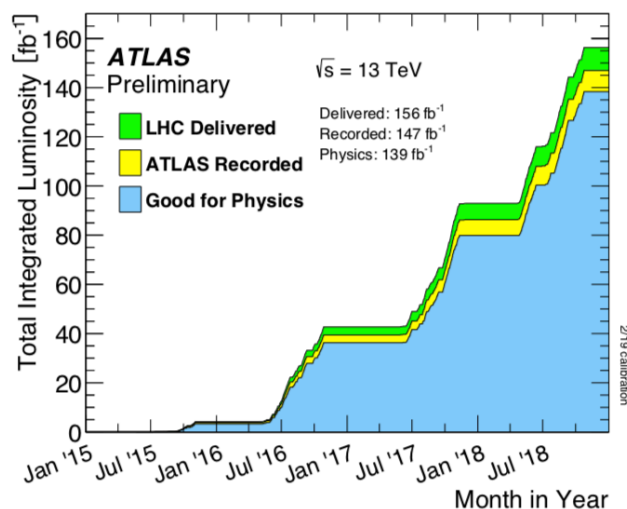
14 / 13 TeV [13.6 / 13 TeV] cross-section ratios



Detector Maintenance and Phase 1 upgrade → All subdetectors and Trigger involved

Run-2 dataset (2015–2018)

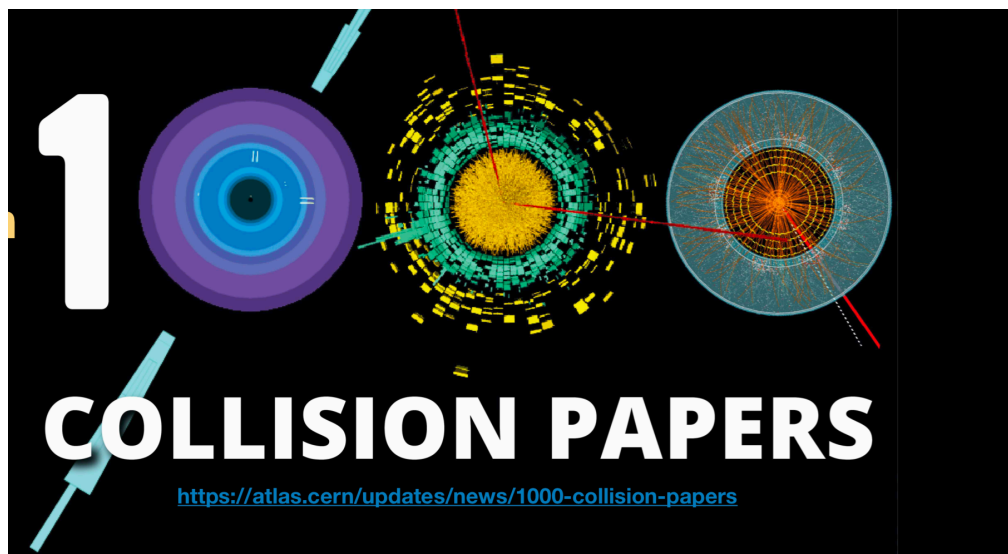
Excellent data-taking (94.2%) and data quality (94.6%) efficiency



Particle	Produced in 140 fb ⁻¹ pp at $\sqrt{s} = 13$ TeV	
Higgs boson	7.8 million	
Top quark	275 million	(115 million tt)
Z boson	8 billion	(→ $\ell\ell$, 270 million per flavour)
W boson	26 billion	(→ $\ell\nu$, 2.8 billion per flavour)
Bottom quark	~160 trillion	(significantly reduced by acceptance)

After an outstanding Run 2 — we have in our hands the richest hadron collision data sample ever recorded

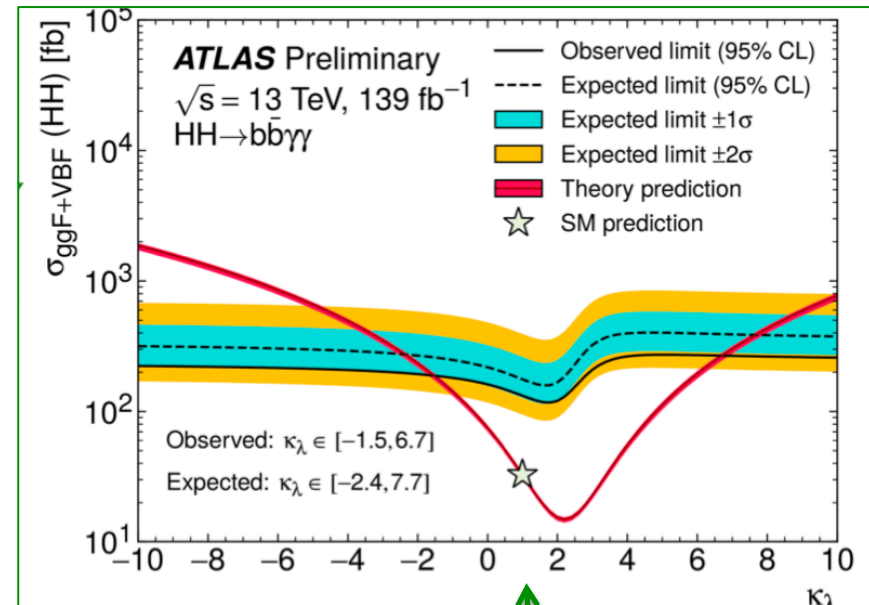
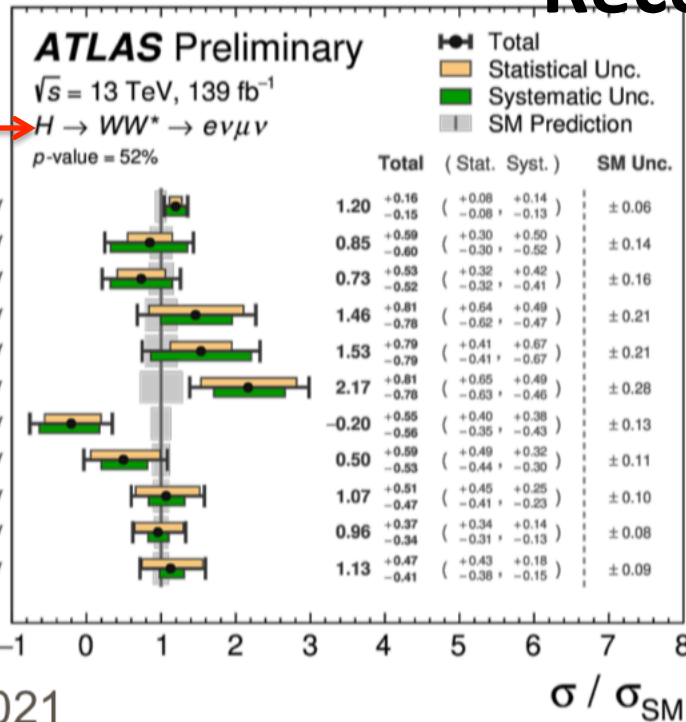
136 results (95 papers) with full Run-2 dataset: <https://twiki.cern.ch/twiki/bin/view/AtlasPublic/ResultswithData2018>



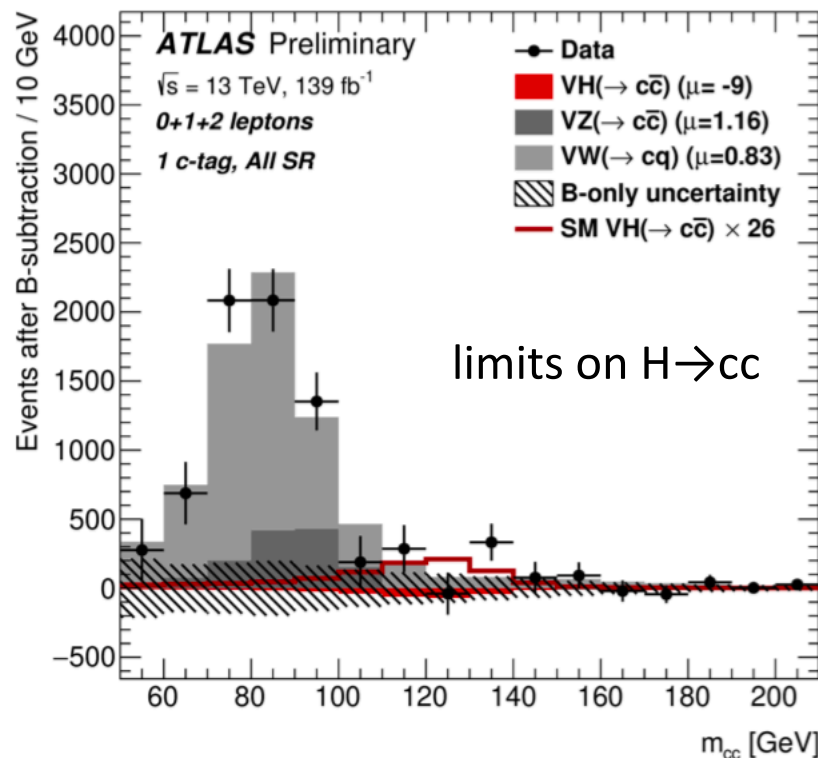
Recent highlights on HIGGS

High statistics
 $H \rightarrow WW^* \rightarrow e\nu\mu\nu$
 allows studies of
 different Higgs
 production
 modes

Separate sample
 using Njet and
 dedicated deep
 NN for VBF



- Di-Higgs production sensitive to H self-coupling
 - Most sensitive channel $HH \rightarrow b\bar{b}\gamma\gamma$ (Combining high-BR bb and clean low-BR $\gamma\gamma$)
 - Limit $\sigma_{HH} < 130 \text{ fb}$ at 95% CL ($4.1 \times \text{SM}$)
- A key topic for Run-3 and HL-LHC!



Natural calibration signal from VV production,
 Simultaneous fit to all three signals
 95% C.L. limit on $VH(cc)$: $\mu < 26$, i.e. $26 \times \text{SM expt.}$

Recent highlights

Lepton flavour conservation 'accidental' in SM - But violated in neutrino oscillations

- Heavy neutrinos – could cause $Z \rightarrow e/\mu + \tau$ at 10^{-5}

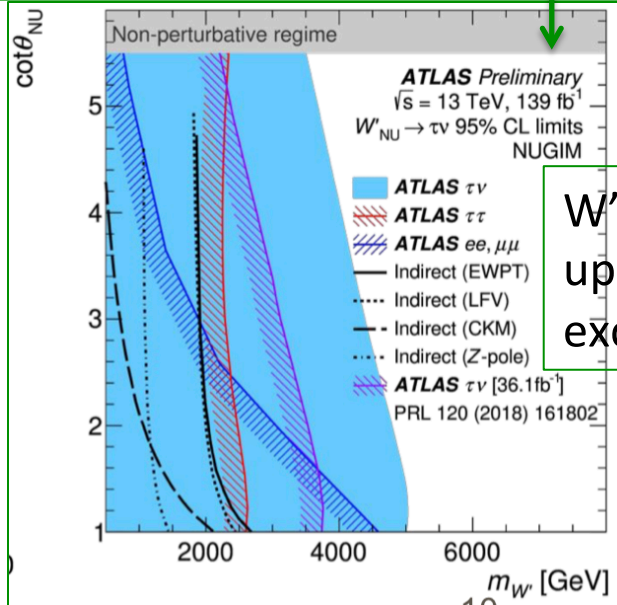
$$\mathcal{B}(Z \rightarrow e\tau) < 5.0 \times 10^{-6}$$

factor of 2 improvement
over LEP results

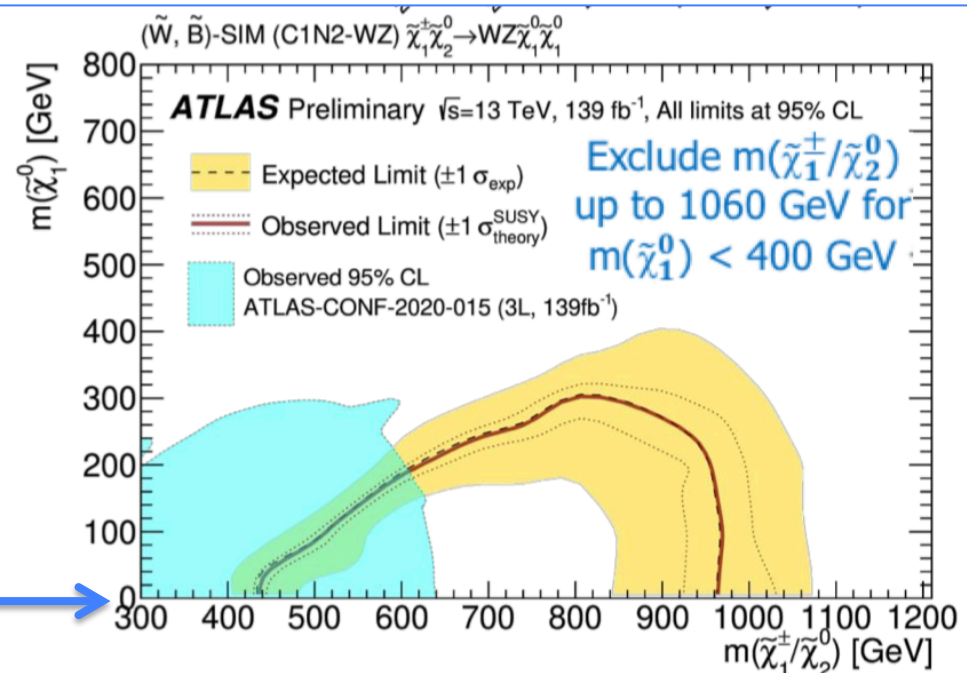
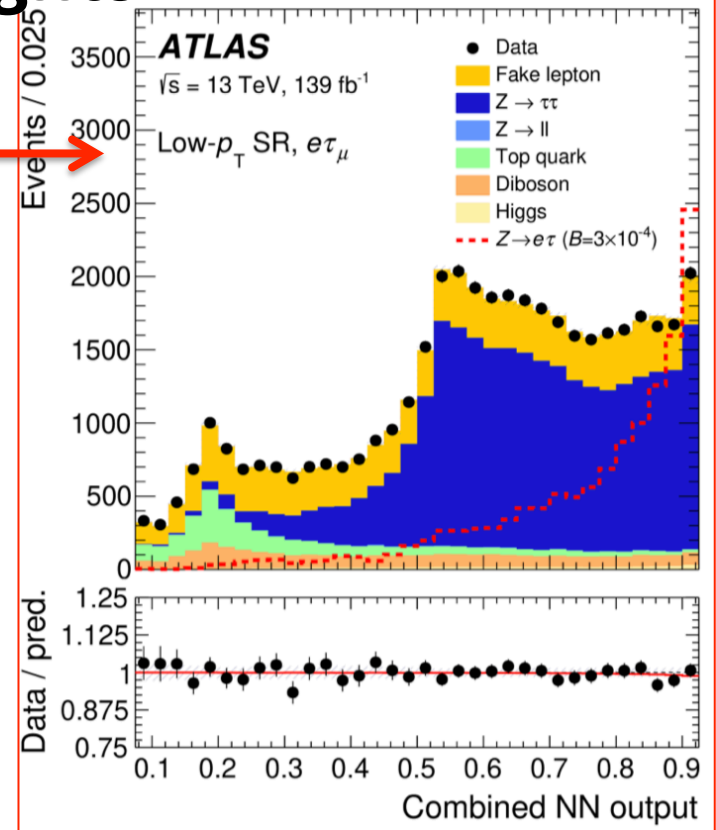
$$\mathcal{B}(Z \rightarrow \mu\tau) < 6.5 \times 10^{-6}$$

Heavy W bosons decaying to fermions: $W' \rightarrow \tau\nu$

- non-universal gauge interaction model, enhanced τ coupling if $\cot\theta_{\text{NU}} > 1$
- Search for events with hadronic τ candidate and large E_{miss}



W' with masses
up to 3.5-5.0 TeV
excluded



SUSY all-hadronic search

- $E_{\text{miss}} + 2$ large-R jets tagged as W, Z or H

Towards Run 3

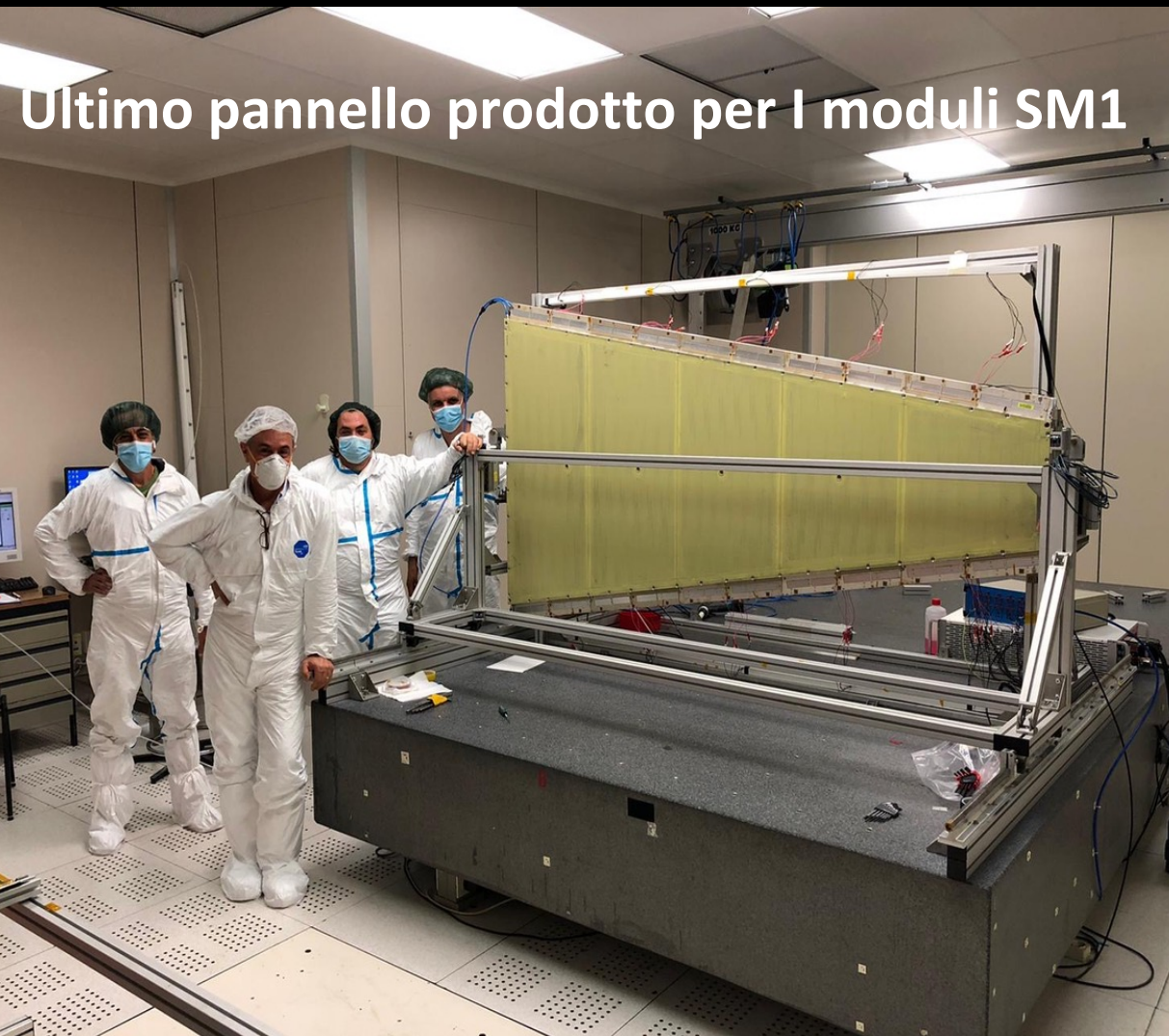
$\sqrt{s} = 13.6$ TeV

Start physics data taking in late May 2022

- LHC Run-3 from 2022 to 2024
 - Hoping for $\sqrt{s}=13.6$ TeV or higher, and another 150-300 fb⁻¹ of pp data
 - Pileup leveled at $\langle\mu\rangle \approx 50$ for much of fill
- ATLAS detector upgrades
 - Muon New Small Wheels in forward region – MicroMega and sTGC detectors
 - Finer granularity of L1 electron/photon trigger
 - More capable L1 ‘topological’ trigger
- Preparing for Run-3
 - New multithreaded software release (rel. 22)
 - Allowing more efficient use of modern computing architectures with many CPU cores
 - Reprocessing all Run-2 data for eventual combination with Run-3 dataset
 - New trigger possibilities: lowering/sharpening thresholds to look in all corners
 - New physics ideas ...

**ATLAS NSW (2020-2021) (G. FIORE, E.
GORINI, F. GRAVILI, M. GRECO, A. INNOCENTE, A.
MICCOLI, M. PEPE, M. PRIMAVERA, A. VENTURA)
E PRESTO SI AGGIUNGERA' R. ASSIRO**

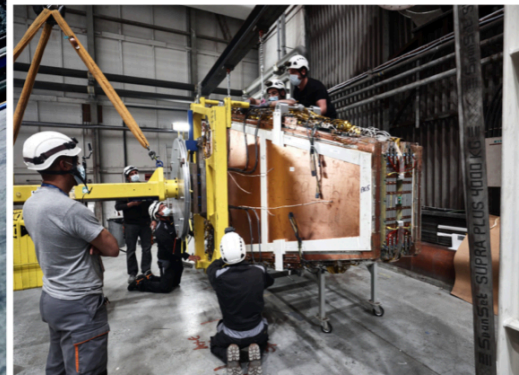
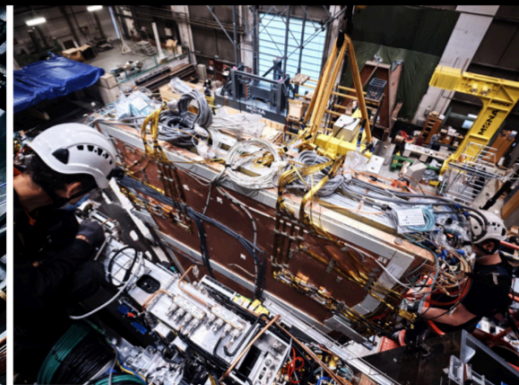
From MicroMeGas Module to the NSW



Supporto a Lecce alla costruzione dei moduli SM1 delle MM:

- Lavorazione Barre dei Gap Frame
- Lavorazioni meccaniche varie

Phase-I upgrade — New Small Wheel



All photos by Max Brice (CERN), see: <https://atlas.cern/updates/news/NSW-final-Slice>

Two technologies: MicroMegas (MM) and sTGC
(2x2 wedges form a sector, 8 large + 8 small sectors per wheel, 2 wheels)

Chamber production complete

Integration status:

- A-side: fully complete
- C-side: both MM and sTGC on schedule

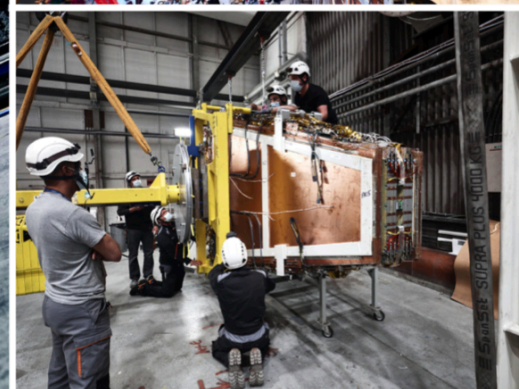
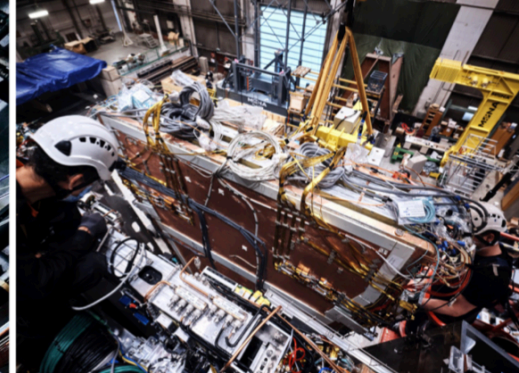
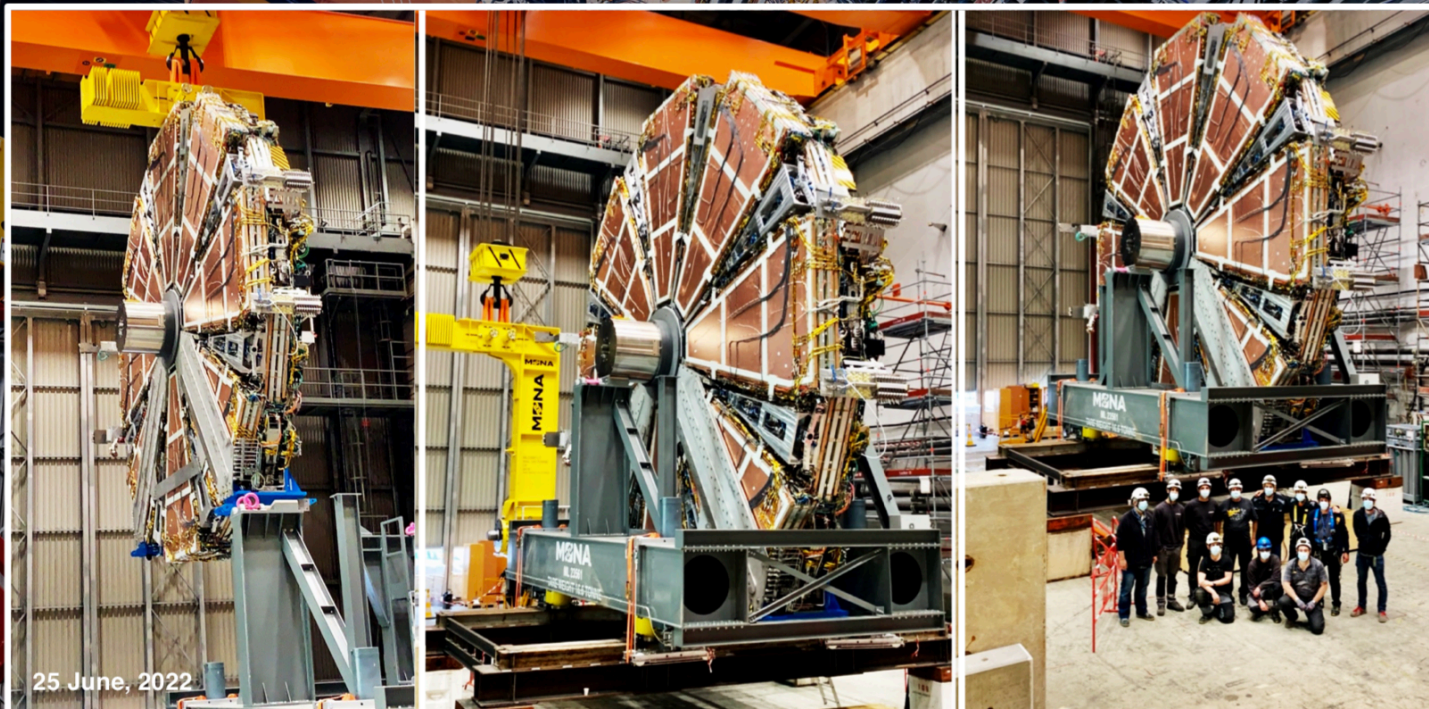
Sector commissioning and technical issues

- HV issues on large MM sectors acceptable (significant improvement by small isobutane admixture to gas possible)
- Electronics noise problems mitigated by improved grounding & filtering

Next milestones

- NSW-A: transport to P1: 6 Jul, fully connected: 5 Aug
- NSW-C: all sectors installed: 10 Sep, ready: 4 Oct, transport to P1: 29 Oct, connected: 8 Dec

Phase-I upgrade — New Small Wheel



Tra cui Lecce,
con l'enorme
lavoro fatto
dai nostri

tecnici

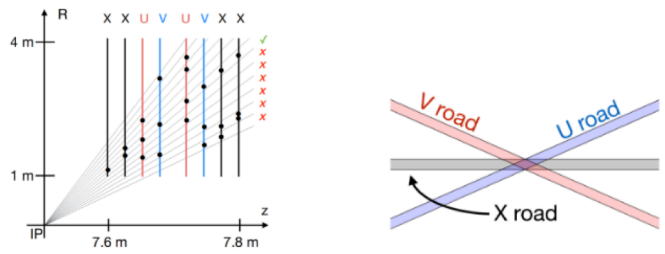
(Alessandro,
Angelo,
Marco, Pino)
e il costante
impegno di
Edoardo nel
seguire tutte
le varie fasi
del progetto

Congratulations to the teams in the institutes throughout the world
and at CERN for achieving such impressive progress on the way to
completing the Muon New Small Wheel

Our thoughts and gratitude are with Stephanie Zimmermann whose
immense leadership moved this challenging project forward



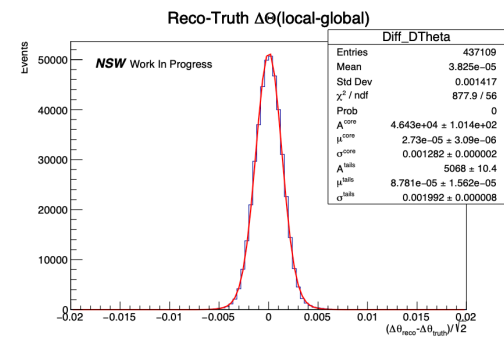
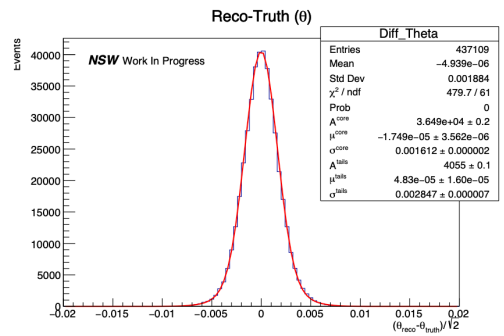
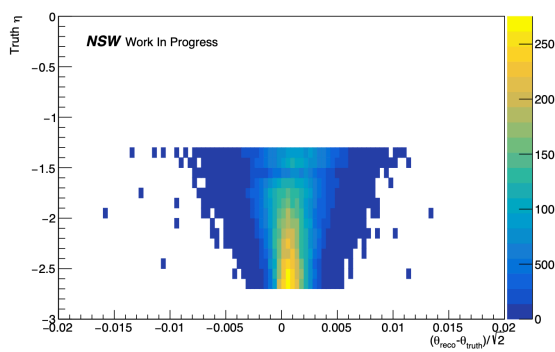
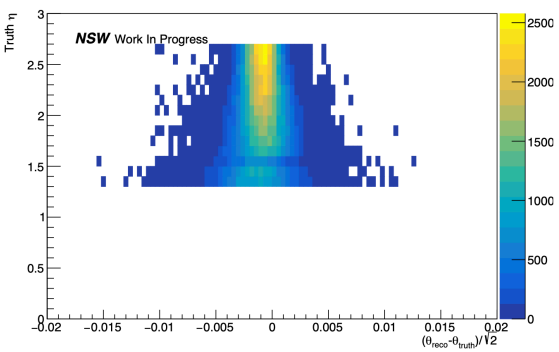
NEW SMALL WHEEL MICROMEAS&TRIGGER



Resolutions in Theta and $\Delta\theta$

Implementation of a new algorithm used in the Trigger Processor: *Diamond Roads*. It is a replacement of the previous one algorithm, based on local and global θ of the triggered segment

Residuals VS truth p_T



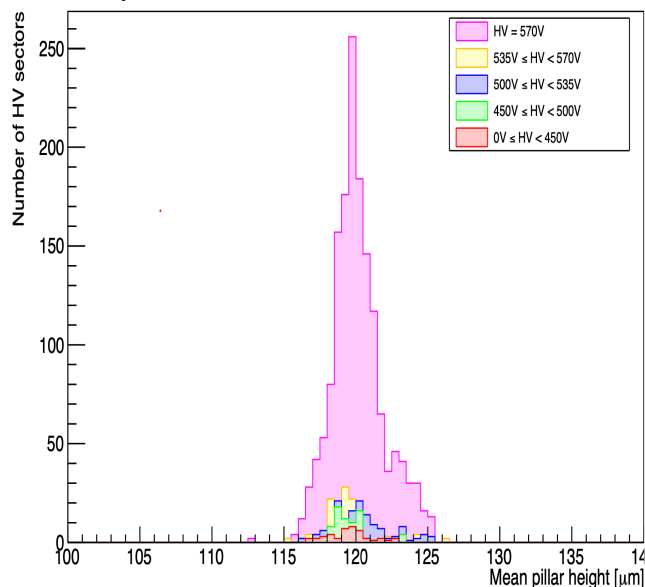
....e il lavoro di Francesco Gravili sulla simulazione del trigger con le MM

Correlazione tra i parametri costruttivi delle MicroMegas e le loro Performance

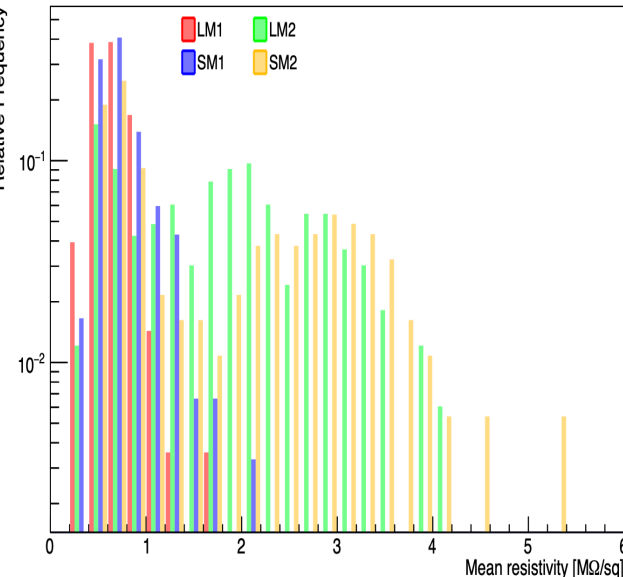
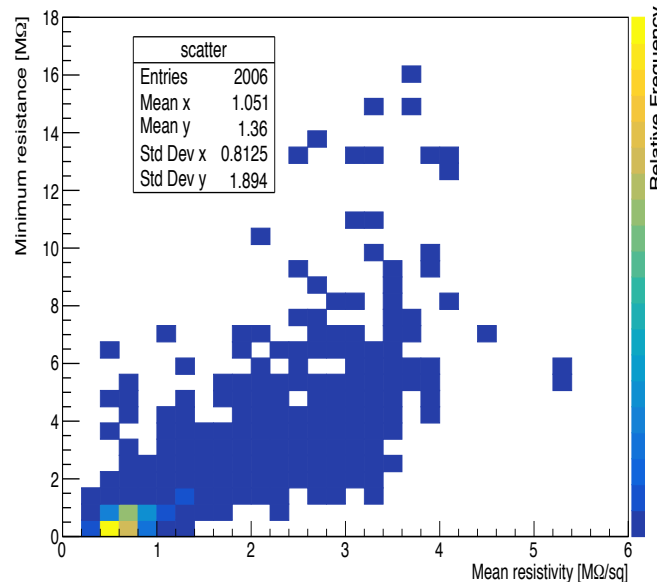
....e quello di Matteo Greco per la sua qualificazione in ATLAS

- Raccolta dei dati da diversi DataBase di Produzione in un unico file di Riferimento
- Validazione delle diverse informazioni
- Studio delle caratteristiche costruttive dei Moduli in funzione delle loro performance ai Test stand e in Fase di Integrazione sui Wedge ed in generale sulla Wheel

Correlazione tra l'altezza dei pillar e l'HV



Correlazione tra resistività media e resistenza minima del PCB



MUONS 2020-2021 (G. CHIODINI, G. FIORE, E. GORINI, A. INNOCENTE, A. MICCOLI, M. PRIMAVERA, S. SPAGNOLO, A. VENTURA)

EUROPEAN ORGANISATION FOR NUCLEAR RESEARCH (CERN)



Submitted to: JINST Accepted by JINST

G. Fiore, A. Innocente, A. Miccoli
Maintenance RPC
G. Chiodini, S. Spagnolo
DQ, software di servizio
E. Gorini, M. Primavera, A. Ventura
L1 trigger performance



CERN-EP-2020-245
2nd March 2021

Performance of the ATLAS RPC detector and Level-1 muon barrel trigger at $\sqrt{s} = 13$ TeV

The ATLAS Collaboration

Prof. Daniele Martello
Director of INFN Lecce and
Dr. Margherita Primavera
Institute Representative of ATLAS Lecce

Geneva, June 3, 2021

Acknowledgement

Dear Prof. Martello and dear Dr. Primavera

Recently the ATLAS Collaboration has published a paper summarising the RPC detector and the Level-1 muon barrel trigger performance during the run-2 data taking. As the project leader of the ATLAS muon system, I would like to take this opportunity to thank the Lecce institute for their longstanding commitment and efforts on the maintenance and operation of the RPC detector.

In particular, I would like to mention the crucial contributions that G. Fiore, A. Innocente and A. Miccoli made over many years in the construction, assembly and installation of RPC chambers, as well as in their commissioning and maintenance, including the RPC gas system.

The very successful operation and efficient data taking would not be possible without the tireless efforts in all technical aspects of the detector.

Sincerely,



(Project Leader of the ATLAS Muon System)

Our (italian IR involved in RPC/trigger, among others) struggle for the recognition of the work of technicians in performance papers has led to this:

Update Proposal — Authorship Policy



A. Hoecker, in the Collaboration Board on July 2nd

Following discussions at various levels about the recognition of engineers and technicians working for ATLAS and their possible exceptional authorship on technical ATLAS papers, which has received strong support in the ATLAS Executive Board, an amendment to the last paragraph of Section 3.4.2 of the Authorship Policy document is proposed.

The updated document is attached to the agenda. All proposed changes are indicated in red and shown below. They have been agreed upon with the Authorship Committee.

3.4.2 Additional authors for a particular paper

[...]

Institute Representatives may recommend members of their Institution who would not normally qualify as authors and yet who have made a significant contribution to ATLAS. It may be appropriate to recognise key **engineers, technicians or technical experts** on technical **or detector performance** papers describing work to which they contributed. In all cases, the AC Chairperson, **in consultation with the relevant Project Leader or Activity Coordinator**, will make a recommendation to the Spokesperson.

The ultimate decision **on all additional authorship cases described in this subsection** lies with the Spokesperson.

Approved by CB!

**MUON TRIGGER 2020-2021 (E. GORINI,
F.G. GRAVILI, M. PRIMAVERA, A. VENTURA)**

Muon Trigger activities in Lecce

- Muon trigger performance & validation studies, with focus on AthenaMT releases validation (signatures & menus)
 - Until now, 13 validation rounds, following the transition Run 2 → Run 3
- Contributions to muon trigger studies:
 - Efficiencies and momentum/spatial resolution
<https://cds.cern.ch/record/2716326> (CERN-EP-2020-031)
 - ATLAS muon trigger performance in Run 2 (2020 JINST 15 P09015)
<https://iopscience.iop.org/article/10.1088/1748-0221/15/09/P09015>
published in January 2021.
- Shifts for central trigger release validation (~12 weeks/year!!)
 - https://test-atrvshft.web.cern.ch/test-atrvshft/ART_monitor/

Muon Trigger Validation

- **Muon Trigger Validation team** is fully Italian
(activities in Lecce coordinated with RM1 & RM3 colleagues)
<https://twiki.cern.ch/twiki/bin/viewauth/Atlas/TriggerValidation>
- Muon HLT performance/validation studies concern ordinary tasks/responsibilities including:
 - Offline monitoring checks on trigger counts and relevant variables
 - Weekly reports on muon trigger JIRA issues
 - Bi-weekly reports in Muon Trigger Signature Group
 - Periodic reports on Muon Trigger in central Trigger²³ Validation meetings
 - Updates in Trigger Validation monitoring page

Validation studies on muon triggers

- Bachelor degree thesis:
«The muon trigger validation system of the ATLAS experiment for the Run 3 of the Large Hadron Collider»
L. Russo (Rel.: A. Ventura)
- Study of the most relevant L1 and HLT muon trigger algorithm distributions and corresponding efficiencies

Assessment Details:

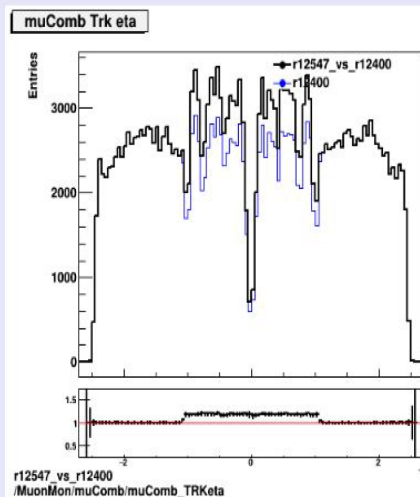
Name: muComb_TRKeta
Status: Red
Algorithm: RepeatAlgorithm
Num. of Entries: 258431
Underflow: 0
Overflow: 0

Configuration Parameters:

AuxAlgName: 1
Chi2Test_Chi2_per_NDF: 1
RepeatAlgorithm: 1
ResultsNEntries: 1
Chi2_per_NDF
XXXXXXXXX
1 1.5
refSource: Multiple
references Results

Results:

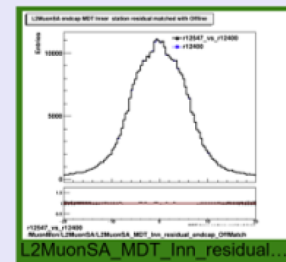
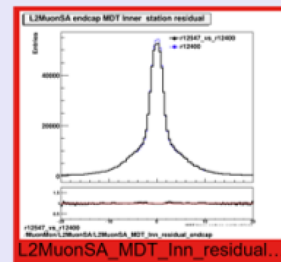
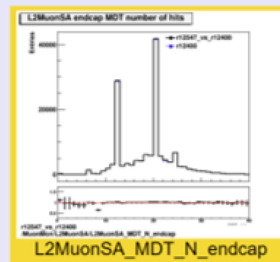
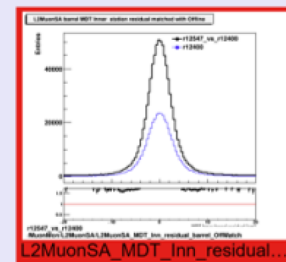
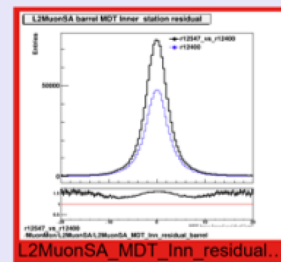
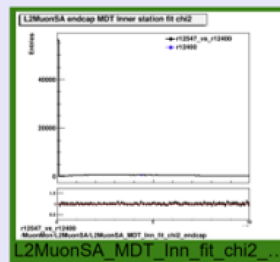
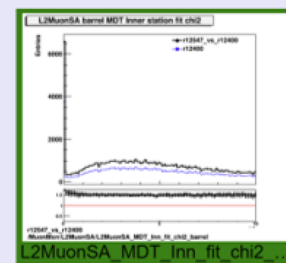
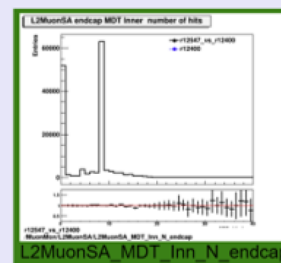
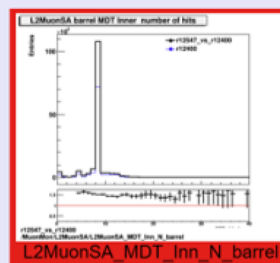
r12400|Chi2_per_NDF: 8.524
r12400|NEntries: 2.404e+05



r12547_vs_r12400
MuonMon/L2MuonSA

[Only Red] [Only Yellow] [Only Green]

Click on images for details and full size.



Muon Trigger Notes, Papers, etc.

- <https://cds.cern.ch/record/2716326> (CERN-EP-2020-031)
- ATLAS muon trigger performance (2020 JINST 15 P09015)
<https://iopscience.iop.org/article/10.1088/1402-4896/ab8a71>

Responsabilita' (L3):

A. Ventura: Muon trigger validation coordination

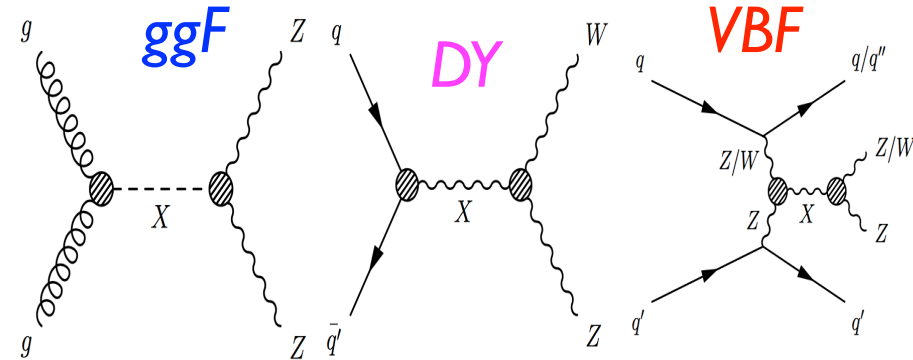
MM in Trigger simulation activity (F.G. Gravili) already described among NSW activities

**DIBOSON RESONANCES AND FLAVOUR
TAGGING 2020-2021** (M. CENTONZE, G. CHIODINI,
A. PALAZZO, E.J. SCHIOPPA, S. SPAGNOLO)

Ricerca di segnali di nuova fisica nella produzione (risonante e non) di ZV in $ll+jets$

Produzione di coppie di bosoni di gauge ZV ($V=Z$ o W) con una Z ricostruita in ee oppure $\mu\mu$ e l'altro bosone (Z o W) in adroni

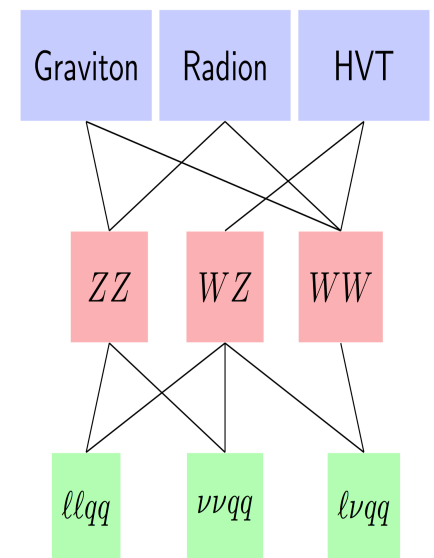
Tre meccanismi di produzione



Tre modelli per l'interpretazione:

- 1) Spin 0: Radion (eccitazione scalare del campo gravitazionale in modelli Randall Sundrum)
- 2) Spin 1: nuovi bosoni di gauge in HVT
- 3) Spin 2: graviton in modelli Randall Sundrum

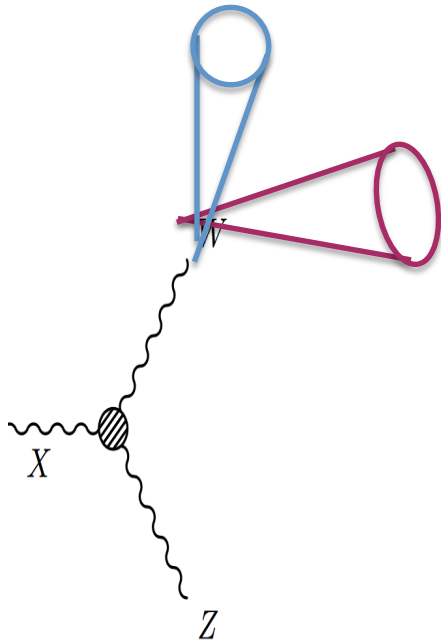
Tre canali: 0, 1 e 2 leptons



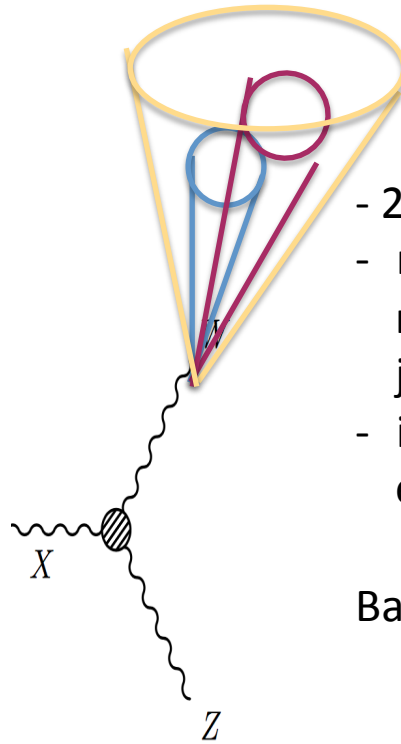
- Canale studiato a Lecce sin dal 2015
- *prima analisi su tutta la statistica del Run-2 ($139fb^{-1}$ a 13 TeV) sviluppata in ATL-COM-PHYS-2018-1549 (autori K.Bachas, G.Chiodini, S.Spagnolo + altri autori):*
 - Pubblicata da ATLAS il 30 Aprile 2020 su Eur. Phys. J. C 80 (2020) 1165
- interpretazione di fisica limitata a produzione risonante
- Nuovo gruppo di analisi con obiettivo di fisica esteso, interpretazione in EFT (oltre che in modelli di benchmark), ricostruzione e calibrazione dei dati piu' accurata e strategia di analisi statistica ottimizzata (uso esteso di ML)

Ricerca di segnali di nuova fisica nella produzione (risonante e non) di ZV in $\ell\ell$ +jets

produzione ggF / DY



*nella produzione VBF si
aggiungono 2 jet forward*



- 2 regimi per la ricostruzione di W/Z $\rightarrow$ adroni
- nel regime di alto p_T del W/Z adronico, due regioni di diversa purezza (massa del large-R jet e indicatori di sottostruttura a 2 jet)
- il large-R jet o i 2 jet risolti possono o meno essere identificati come b-jets

Background dominante Z+jets

*2 jet (standard) da W o Z
oltre a $\mu\mu$ o ee da Z*

regime di alto p_T , m_X

*large R-jet, in cui confluiscono i
due jet adronici che non
possono essere risolti*

*15 regioni di segnale e
15 regioni di controllo*

Ricerca di segnali di nuova fisica nella produzione (risonante e non) di ZV in ll+jets

- Contributi leccesi finora:
 - **Validazione di dati preselezionati e ricostruiti usando metodologie innovative per la ricostruzione dei jet**
 - standard jet (due opzioni)
 - clusters topologici nei calorimetri
 - ***particle-flow jets*** (clusters + tracce)

migliori performance attese
da validare
 - large-R jet (tre opzioni)
 - standard jet basati su clusters, opportunamente calibrati
 - track-calo-cluster jets (tre opzioni)
 - ***UFO*** (unified flow object, tracking e clusters nel calorimetro usati in modo dinamico a seconda della configurazione)

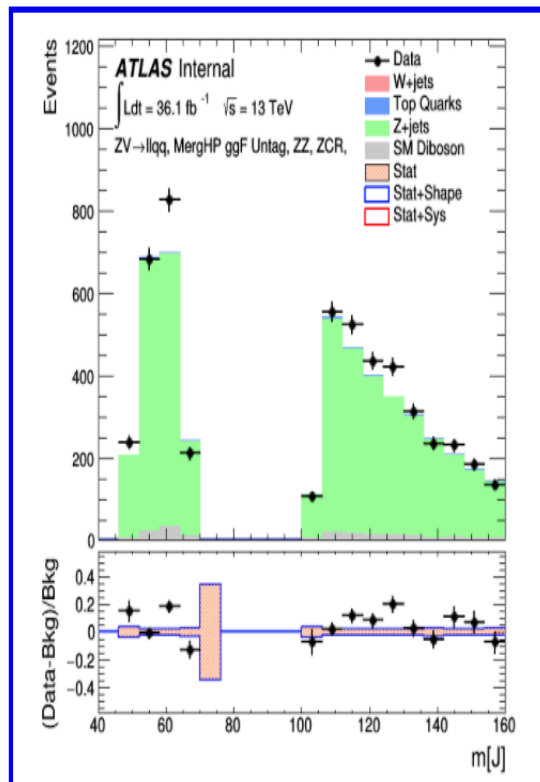
migliori performance attese
da validare
 - **Refresh di una DNN (parametrica) per il riconoscimento di segnale da fondo**
 - validazione tecnica del sw
 - validazione fisica
 - obiettivo: migliorare la sensibilità / limiti su modelli (dimostrato in passato, da consolidare nella catena della strategia di analisi)
 - **Refresh del codice di selezione; validazione e interfaccia al software di classificazione segnale/fondo**

Ricerca di segnali di nuova fisica nella produzione (risonante e non) di ZV in $\ell\ell$ +jets

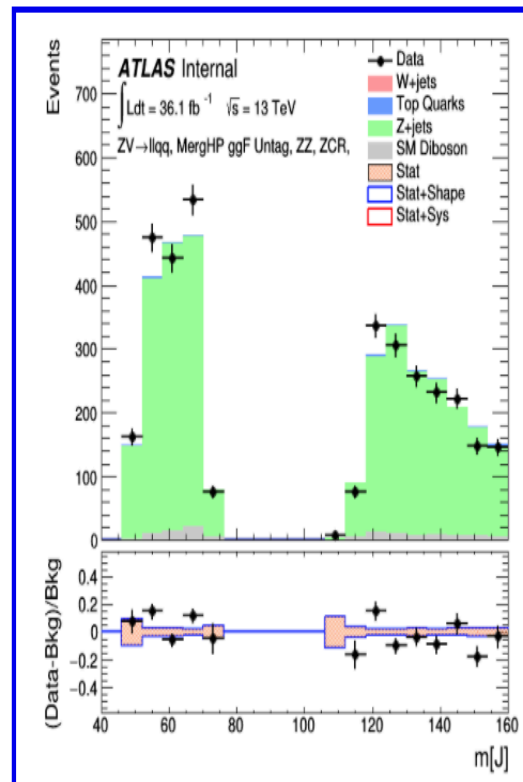
- Validazione di dati preselezionati e ricostruiti usando metodologie innovative per la ricostruzione dei jet

Untag ZCR

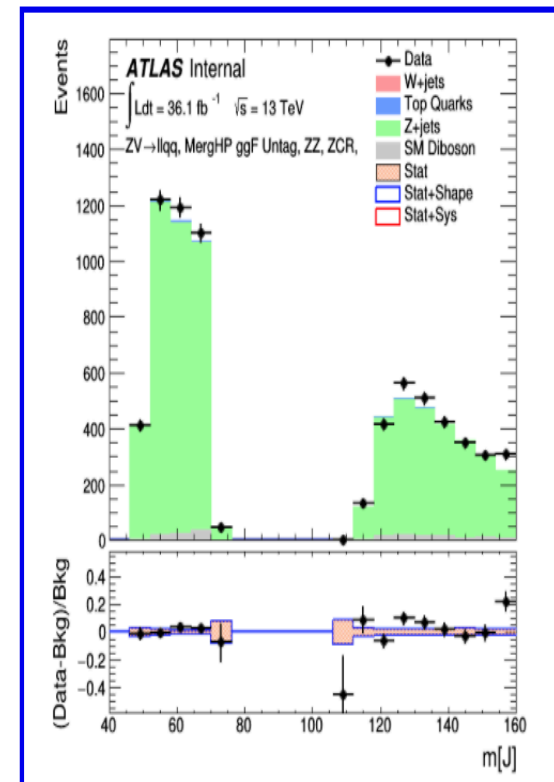
LCTopo_EMTopo



TCC_EMTopo



UFO_PFlow

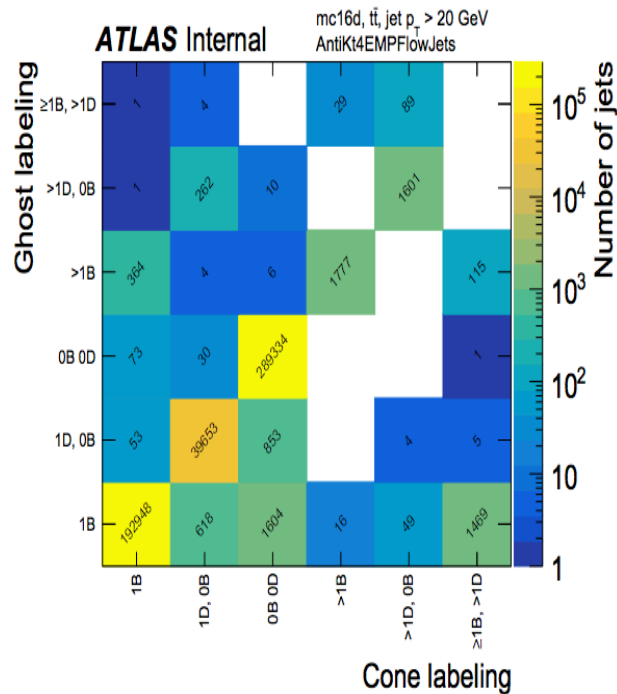


Flavour tagging in ATLAS

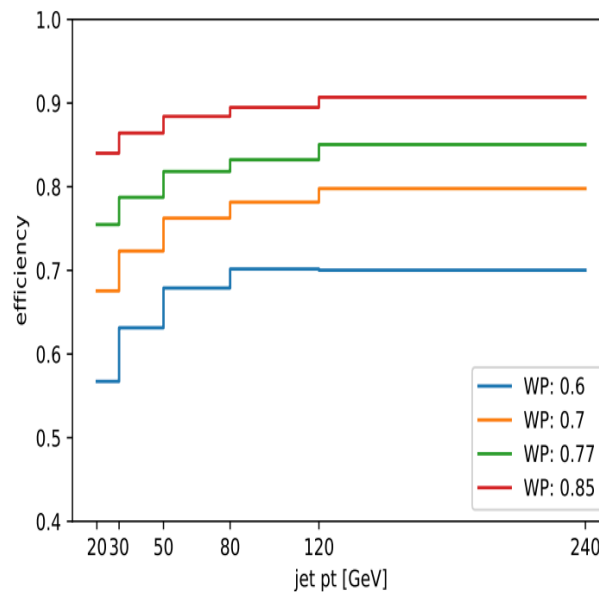
- La discriminazione di jet da quark b, da jet da quark charm o light ha un peso cruciale nella fisica di ATLAS
- b-tagging in ATLAS è basato pesantemente su tecniche di ML ed è un processo sequenziale:
 - algoritmi di basso livello
 - algoritmi di alto livello che usano output degli algoritmi di basso livello
- ***passo preliminare è l'associazione di tracce ai jet***
 - goal: massimizzare l'accettanza per tracce da decadimenti di adroni B e D
 - lo studio dettagliato delle performance di questo passo preliminare è stato oggetto di un progetto portato avanti **da Martino C., con il contributo di A. Palazzo**
 - nota in preparazione
 - **indagine su un approccio alternativo basato su ML, M. Centonze in collaborazione con UCL**

Flavour tagging in ATLAS

Variable-radius track-jets, cone-based
track association, b -jets, $p_T > 10$ GeV

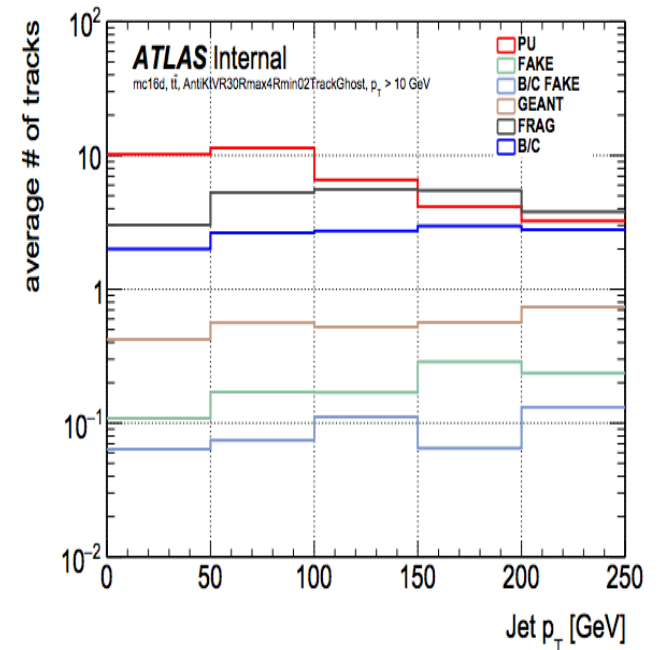


Confronto di diversi metodi
per etichettare b -jet sulla
base della verità MC



DL1r

Confronto di efficienze di
algoritmi per diverse
collezioni di jet processate
con due logiche di
associazione di traccia



Studio della composizione
delle tracce associate a jet
di diverse collezioni
processati con due logiche
di associazione di traccia

DIBOSON AND FLAVOUR TAGGING NOTES, PAPERS, ETC.

NOTES and PAPERS:

- Eur. Phys. J. C 80 (2020) 1165

SUPERSYMMETRY 2020-2021 (F. DE SANTIS, M. GRECO, E. GORINI, F.G. GRAVILI, M. PRIMAVERA, A. VENTURA)

New ATLAS SUSY paper



PUBLISHED FOR SISSA BY SPRINGER

RECEIVED: February 3, 2021

ACCEPTED: March 3, 2021

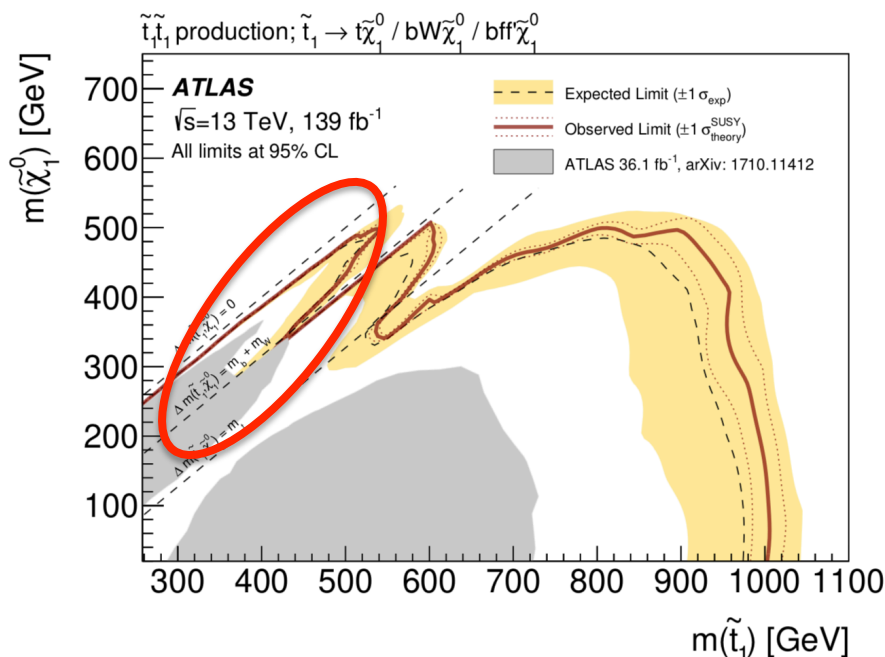
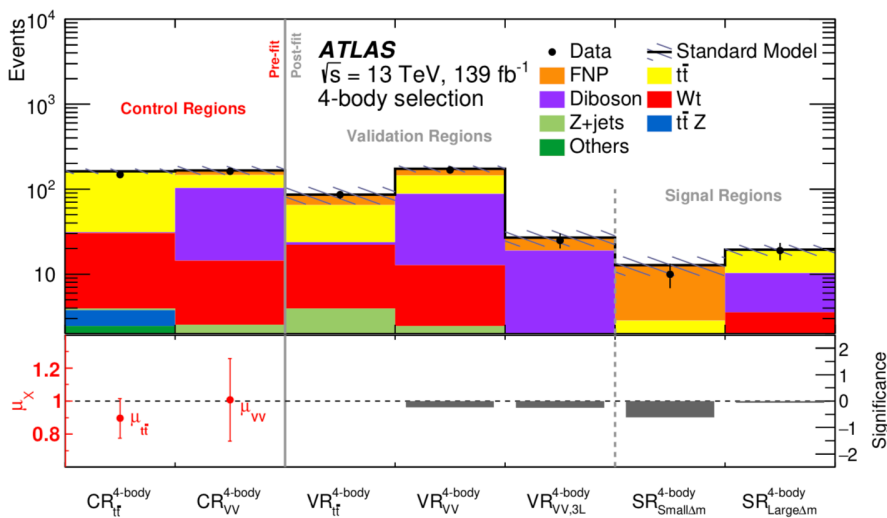
PUBLISHED: April 16, 2021

Studiati vari modelli, il nostro contributo importante per la ricerca di stop che decadono in 4 corpi

Search for new phenomena in events with two opposite-charge leptons, jets and missing transverse momentum in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector



The ATLAS collaboration



ATLAS SUSY EWK paper in preparation for next fall



ATLAS Paper

SUSY-2019-02

8th June 2021



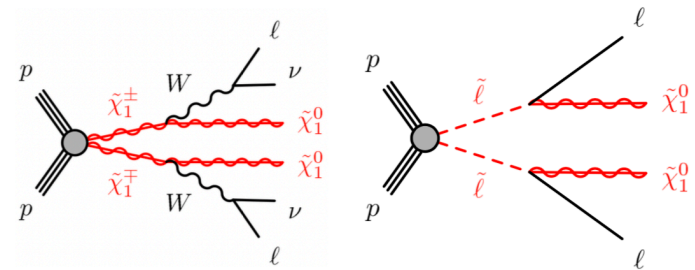
Draft version 1.0

Search for direct production of charginos and sleptons with mass splittings near the electroweak scale decaying into final states with two leptons and missing transverse momentum in $\sqrt{s} = 13$ TeV pp collision with the ATLAS detector

The ATLAS Collaboration

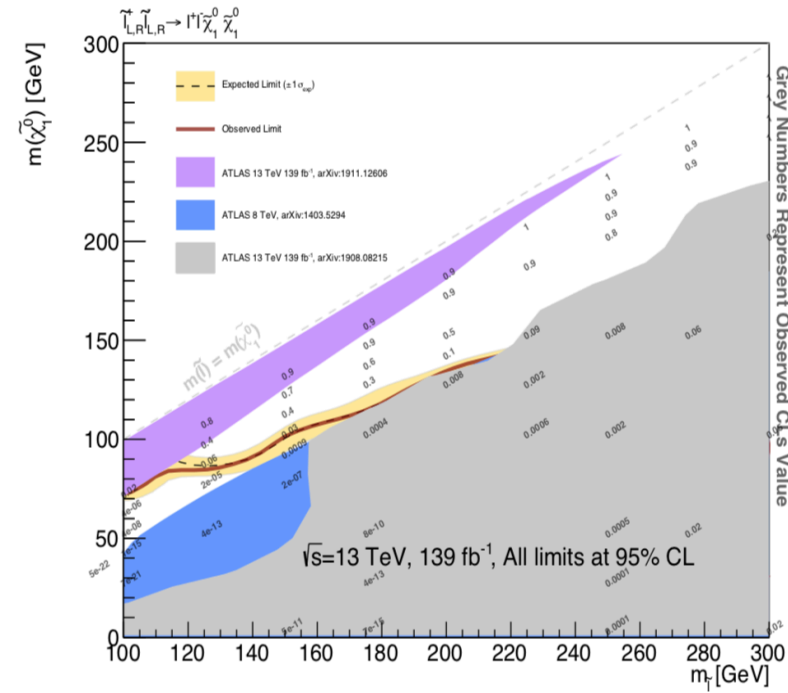
Slepton analysis already unblinded, chargino analysis very close to the unblinding, strong effort here due to the ML approach

Tesi Magistrale: M. Greco → definizione delle regioni di controllo per la stima del background nell'analisi del decadimento del chargino via W con tecniche di Machine Learning

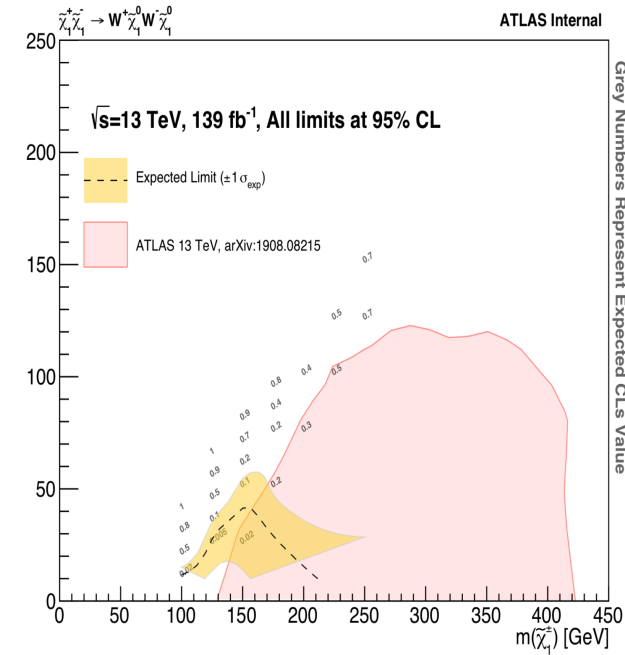
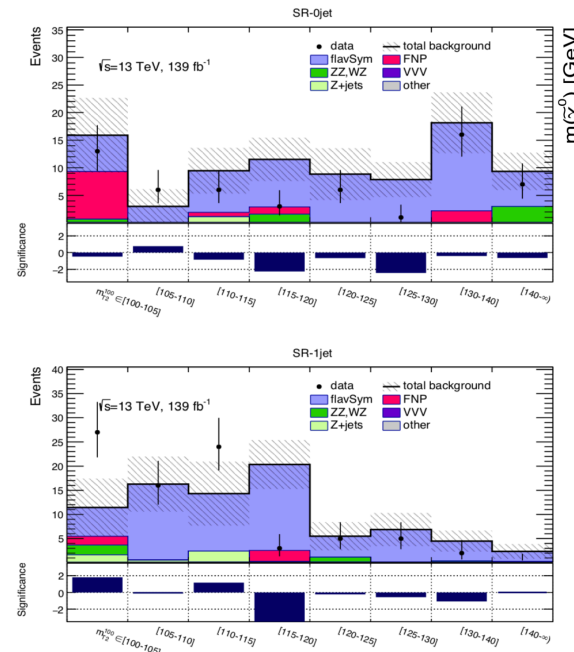


Final results will enter in Tesi PhD: Dott. M. Greco (Tutors: E. Gorini, M. Primavera), M. Primavera Analysis Contact, L3 responsibility

Results on sleptons and Charginos $\rightarrow$ WW



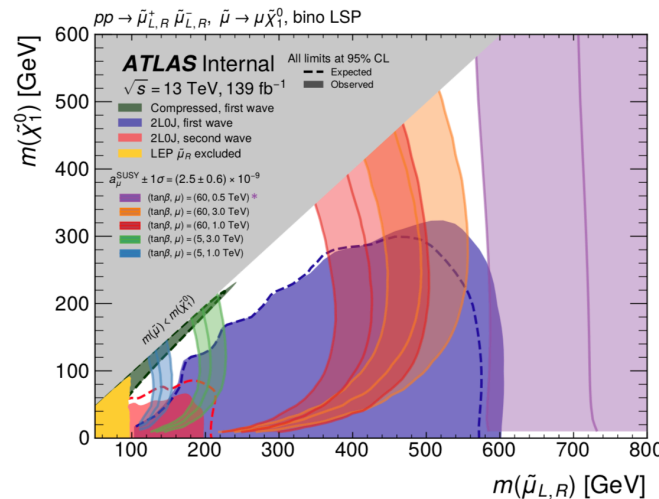
Unblinded



Blinded, expected exclusion

The slepton analysis is crucial for g-2

- Many existing and ongoing searches are sensitive to models favored by g-2
- Propose new smuon summary plots to demonstrate our sensitivity
- Probing smuon-neutralino gap region with Run 2 and Run 3
- searches and high mass smuons with large datasets are excellent physics targets



Shaded bands indicate regions compatible with g-2 anomaly

- The smuon-neutralino gap region is favored for small $\tan \beta$
- High mass smuon region is favored for large $\tan \beta$
- **Need to ensure that our searches cover the full mass plane!**

SUSY upgrade studies

- We are also involved on SUSY upgrade studies for HL-LHC
- Studies are based on gen-level events smeared with performance functions.
- Snowmass efforts drive the timeline

Tesi Magistrale: F. de Santis → Ricerca di particelle supersimmetriche all'esperimento ATLAS ad LHC e prospettive di scoperta ad HL-LHC e ai futuri colliders

ATLAS timeline for Snowmass

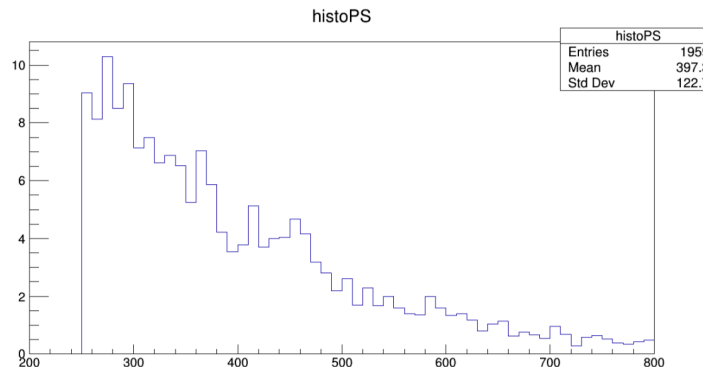
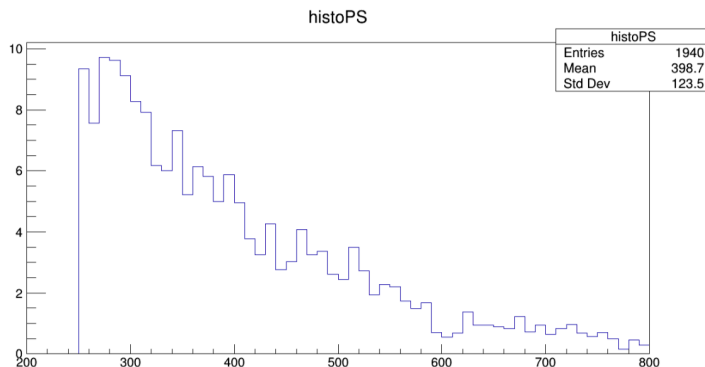
(also presented [here](#))

Milestone	Deadline
White paper submission	15 March 2022
ATLAS & CMS paper	01 March 2022
ATLAS PUB notes ready	15 December 2021
ATLAS PUB note circulation	15 November 2021
Physics WG approval	01 November 2021
Physics WG analysis review	01 October 2021
Complete draft of supporting note	01 September 2021

- Sensitivity studies to discover or exclusion of stop → 4-body decay at HL-LHC
- Main goal is the optimization of the Signal Region definitions used at Run2 for the paper recently published
- The setup of the whole machinery (signal and background generation @14 TeV, Run4 setup, calibrations, etc.) is ongoing

Generated at 13 TeV, scaled to 14 TeV

Generated at 14 TeV



MET distribution for the stop-neutralino mass signal point (540,470)

SUSY Notes, Papers, etc.

NOTES and PAPERS:

- "Search for new phenomena in events with two opposite-charge leptons, jets and missing transverse momentum in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector", ATLAS Collaboration, JHEP 04 (2021) 165, DOI:10.1007/JHEP04(2021)165
- ANA-SUSY-2019-02-INT1
"Search for direct production of charginos and sleptons with mass splittings near the electroweak scale decaying into final states with two leptons and missing transverse momentum in $\sqrt{s} = 13$ TeV pp collisions using the ATLAS detector", J. Assahsah et al.
- ANA-SUSY-2019-02-PAPER

In preparation

Responsabilit :

F. G. Gravili: SUSY HEPdata contact (L3)

M. Primavera: Analysis Contact per SUSY EWK 2L0J analysis paper dal 2017 a oggi, in quanto riconfermata per guidare le analisi del Run2 "second wave" (L3)

M. Primavera: Membro dello speaker committee di ATLAS (L2)

Awards:

La comunicazione "Ricerca di produzione di coppie di squarks top e Materia Oscura in stati finali con due leptoni con i dati raccolti dall'esperimento ATLAS durante il Run 2 di LHC" di Francesco Gravili al Congresso Nazionale SIF 2020 e' stata selezionata fra le migliori presentazioni, e pubblicata, a spese della SIF, sul Nuovo Cimento.

COMPUTING 2020-2021 (E.M.V. FASANELLI, A. FORTE, F. RICCIARDI)

TIER3 ATLAS LECCE

INFRASTRUTTURA TIER3

- Computing Element (ce.le.infn.it)
- Storage Element (se.le.infn.it)
 - 36TB dedicati ad ATLAS suddivisi tra:
 - LOCALGROUPDISK 18TB
 - PRODDISK 2TB
 - SCRATCHDISK 16TB
- BDII (bdii.le.infn.it)
- Accounting (grid-apel.le.infn.it)
- Proxy (squid.le.infn.it)
- Worker Node
 - 548 core totali per Grid
 - 80 core garantiti per ATLAS dalle macchine lx30..lx37
 - 344 core attualmente configurati per ATLAS

Enrico M.V. Fasanelli

- coordinatore

Antonio Forte

- site administrator
- monitoring risorse
- gestione ticket Grid
- partecipa mensilmente ai meeting della federazione ATLAS T2/T3

Fulvio Ricciardi

- site amministrator

ATTIVITA' IN CORSO

- monitoring job di analisi
- monitoring job di produzione
- aggiornamento software infrastruttura Grid

Entro il 2021:

- migrazione Computing Elements da CreamCE a HTCondor CE

RICHIESTE 2022

ANAGRAFICA —> 10.1 (7.1 Atlas+3.0 fase2) f.t.e.

CONSUMI

Consumi metabolici = $1.5 * 10.1 = 15.2$ keuro

MISSIONI

metabolismo

Missioni interne = metabolismo (1 keuro, 10.1 fte) = 10.1 keuro + 2 euro Missioni interne a Ge, Bo per training loading e DAQ —> 12.1 Keuro

Missioni estere metabolismo (1 m.u., 10.1 fte) = $10.1 * 4.05 = 41.$ keuro

attività

Missioni al CERN e a RAL per training loading e DCS development Tracker-Fase2 = 8keuro

Missioni al CERN per attività di tecnici e di fisici su commissioning NSW —> + [2 m.u. (tecnici) + 2 m.u. (fisici)] = 16.2 keuro

duties (algoritmo non ancora deciso nella sua versione finale per tutto ATLAS-Italia!!)

l'anno scorso chiesti 18 keuro, seguendo lo stesso algoritmo dell'anno scorso, usando come FTE_duties quelle del 2020 (3.21) —> $(1.5 \text{ mesi}) * (\text{FTE_duties} - \text{FTE_mia resp}) = 1.5 * (3.21 - 0.25) = 4.4$ m.u. Per cui: $4.05 * 4.4 \text{ mesi} == 17.8$ keuro

Responsabilità 2022

Resp. L2 Speaker Committee M. Primavera (3 m.u.) —> 12 Keuro

Totale missioni = 12 (resp.) + 12.1 (interne metab+interne fase 2) + 41 (estere metabolismo) + 8 (attività fase 2) + 16.2 (attività NSW) + 17.8 (Esp) ==
107.1 keuro

ANAGRAFICA 2022

Ricercatori

Centonze 100% Atlas
Chiodini 70% fase2_atlas e 20% Atlas
Gorini 90% Atlas
Greco 100% Atlas
Gravili 100% Atlas
Palazzo 50% ATLAS e 50% fase2_Atlas
Primavera 70% Atlas
Schioppa: 50% ATLAS e 50% fase2_Atlas
Spagnolo 70% fase2_atlas e 20% Atlas
Ventura 90% Atlas

Personale tecnico

Assiro
Innocente
Miccoli
Pepe
Ricciardi
Forte

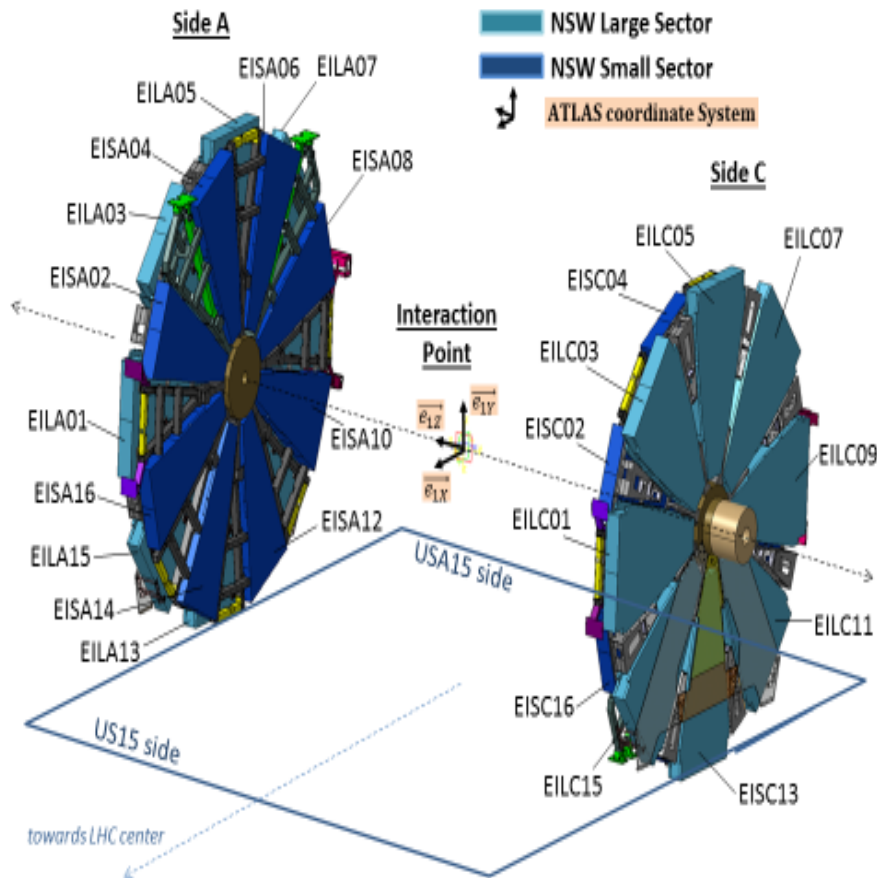
Tecnologi

Coluccia 20% fase2_atlas
Creti 40% fase2_atlas
Fasanelli 20% Atlas

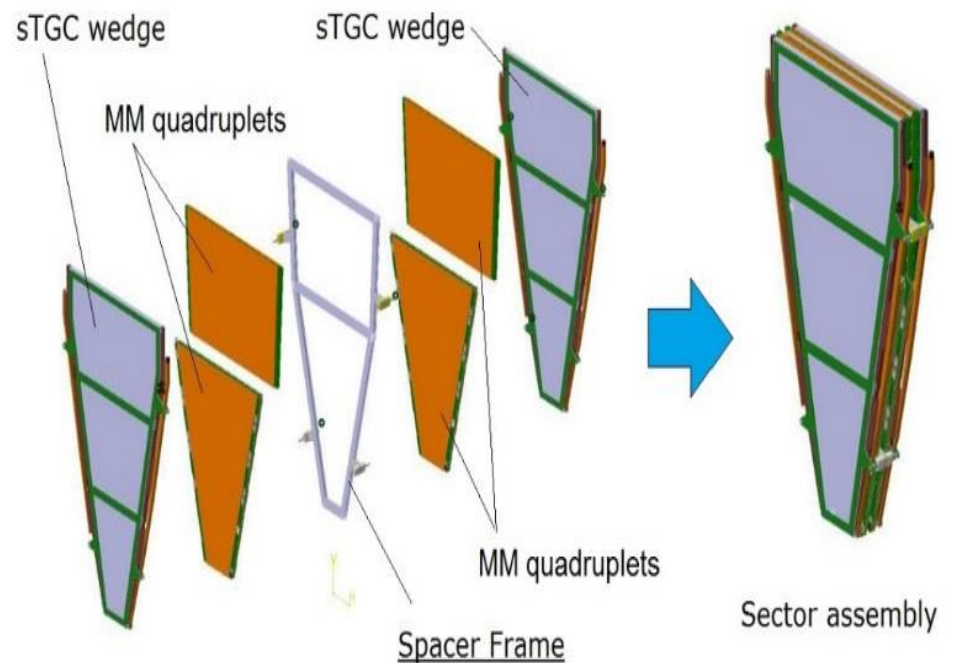
Totale: 10.1 (7.1 Atlas+3.0 fase2) f.t.e.

BACKUP

New Small Wheel Structure



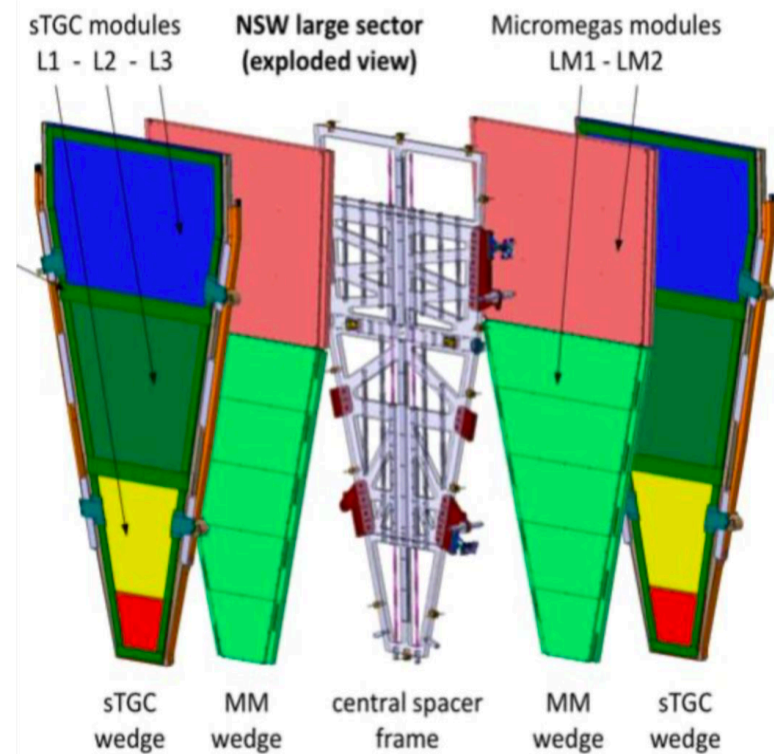
The two ATLAS New Small Wheels with individual sector labels



NSW sectors consists of a:

- Central structure (“Spacer Frame”)
- 4 MicroMegas detector quadruplets that are directly attached to and referenced on the spacer frame
- 2 sTGC detector wedges that will be integrated on the compound before integration on the NSW structure

NSW Elements e moduli MicroMegas (MM)



- 16 sectors per side, 8 small and 8 large
- Each sector comprises 2 sTGC wedges, and a Micromegas double wedge
- Each sTGC wedge made from 3 quadruplets (chambers)
 - separate small and large sector types -- QS1,2,3 and QL1,2,3
 - Production in CA, CL, CN, IL and RU

Supporto a Lecce alla costruzione dei moduli SM1 delle MM:

- **Lavorazione Barre dei Gap Frame**
- **Lavorazioni meccaniche varie**

NSW sectors consists of a:

- Central structure (“Spacer Frame”)
- 4 MicroMegas detector quadruplets that are directly attached to and referenced on the spacer frame
- 2 sTGC detector wedges that will be integrated on the compound before integration on the NSW structure

LHC/ High-Luminosity LHC timeline

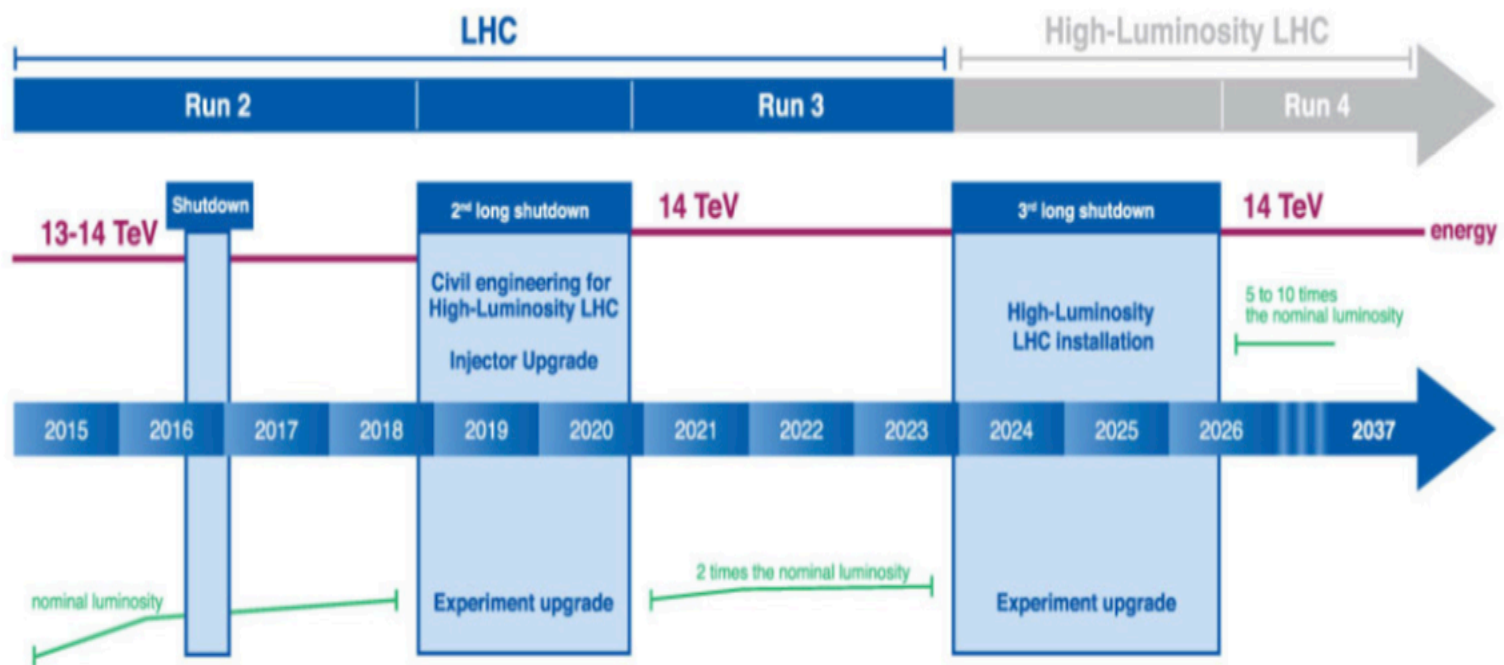


Figure 2.1: LHC schedule up to the HL-LHC phase [85].

	Baseline	Ultimate
Number of colliding bunches in ATLAS	2748	2748
Peak luminosity [$\text{cm}^{-2}\text{s}^{-1}$]	5×10^{34}	7.5×10^{34}
Peak pile-up [collisions/event]	131	197
Luminosity levelling time [hours]	7.4	3.6
End-of-fill luminosity [$\text{cm}^{-2}\text{s}^{-1}$]	3×10^{34}	4.5×10^{34}
Peak pile-up line-density [events/mm]	1.3	1.95
Average pile-up line-density [events/mm]	0.8	1.2
RMS time spread of the luminous region [ps]	178	178
Integrated luminosity [$\text{fb}^{-1}/\text{year}$]	262	326