



Z+b production at LHC with ATLAS -1



test per pQCD e potenziale sensitività alla pdf del b; misura di un background importante alla ricerca di Higgs in ZZ* con b nello stato finale

☐ G. Chiodini, N. Orlando, S. Spagnolo

☐ **misura d'urto differenziale di b-jets in associazione con Z** con i dati di ATLAS a $\sqrt{s}=7$ TeV (run 2011, 4.7fb^{-1})

☐ **evoluzione di sezione d'urto totale di b-jets + Z** con i dati 2010

☐ ATL-COM-PHYS-2011-685 (internal doc.) Phys.Lett. B706 (2012) 295-3

Internal Note	
Report number	ATL-COM-PHYS-2011-685
Title	Measurement of b-jets produced in association with a Z boson at $\sqrt{s}=7$ TeV with the ATLAS detector
Author(s)	Chiodini, G ; Cooper, B ; Gwilliam, C ; Hesketh, G ; Mansoulié, B ; Mehta, A ; Morange, N ; Orlando, N ; Spagnolo, S
Imprint	12 authors 10 Jun 2011. - 11 p.
Note	Supporting note : ATL-COM-PHYS-2011-652 at https://cdsweb.cern.ch/record/1355978
Subject category	Detectors and Experimental Techniques

Information Discussion (8) Files Plots Linkbacks

Internal Note	
Report number	ATL-COM-PHYS-2012-1504
Title	Measurement of Zb and Zbb cross sections with 4.6 fb ⁻¹ of 7 TeV ATLAS data
Author(s)	Bundock, A (Liverpool) ; Chiodini, G (INFN Lecce) ; Davison, P (UCL) ; Hellmich, D (Bonn) ; Hesketh, G (UCL) ; Hillert, S (Bonn) ; Jansen, E (UCL) ; Laycock, P (Liverpool) ; Orlando, N (CERN/Salento) ; Sanders, M (LMU Munich) ; Spagnolo, S (Salento) ; Tibbetts, M (LBNL) ; Vladoiu, D (LMU Munich)
Imprint	12 Oct 2012. - mult. p.

: ATLAS

: D. Z. b-jet ; EWEAK

Measurement of the cross-section for b-jet production in association with a Z boson in pp collisions at a centre-of-mass energy of 7 TeV. The analysis uses the data sample collected by the ATLAS experiment in 2010. The event selection is based on high p_T electrons or muons, and a b-jet identified by its displaced vertex, with transverse energy ET > 10 GeV. After subtraction of backgrounds, the yield is extracted from the candidate b-jets track mass distribution. A perturbative QCD prediction at next-to-leading order is also shown.

☐ in fase di review da parte dell'editorial board interno della collaborazione per la pubblicazione

☐ **Lecce + Liverpool + UCL + LMU + Bonn - pieno coinvolgimento leccese in tutti gli aspetti dell'analisi (selezione, unfolding, background data driven, yield extraction) e infatti...**

☐ **Nicola O. da 1 Luglio 2012 al 30 Giugno 2013 "Associate" al CERN (simil-fellows riservati a giovani PhD o assegnisti INFN per gli esperimenti a LHC) su questo progetto**

☐ **a riconoscimento del contributo a ATLAS SM working group:**

☐ VI Workshop Italiano sulla Fisica p-p a LHC (Maggio 2013, Genova): Marco Musich (TO), Nicola Orlando (LE), "Produzione di W/Z e misura delle loro proprietà"

☐ LISHEP 2013, 17-24 March 2013 Brazil - Rio de Janeiro: Nicola Orlando "QCD results from ATLAS"



Z/W+b production at LHC with ATLAS -2

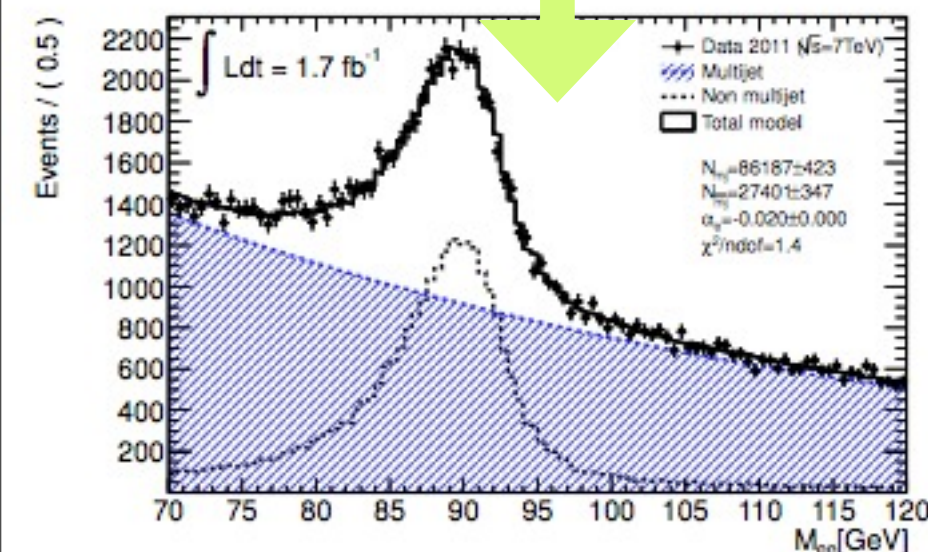
Esempio di studio di una selezione di controllo per la determinazione data driven del background da multi-jet

$$\sigma = \frac{N_b - N_{bkg}}{C \cdot \epsilon \cdot \mathcal{L}}$$

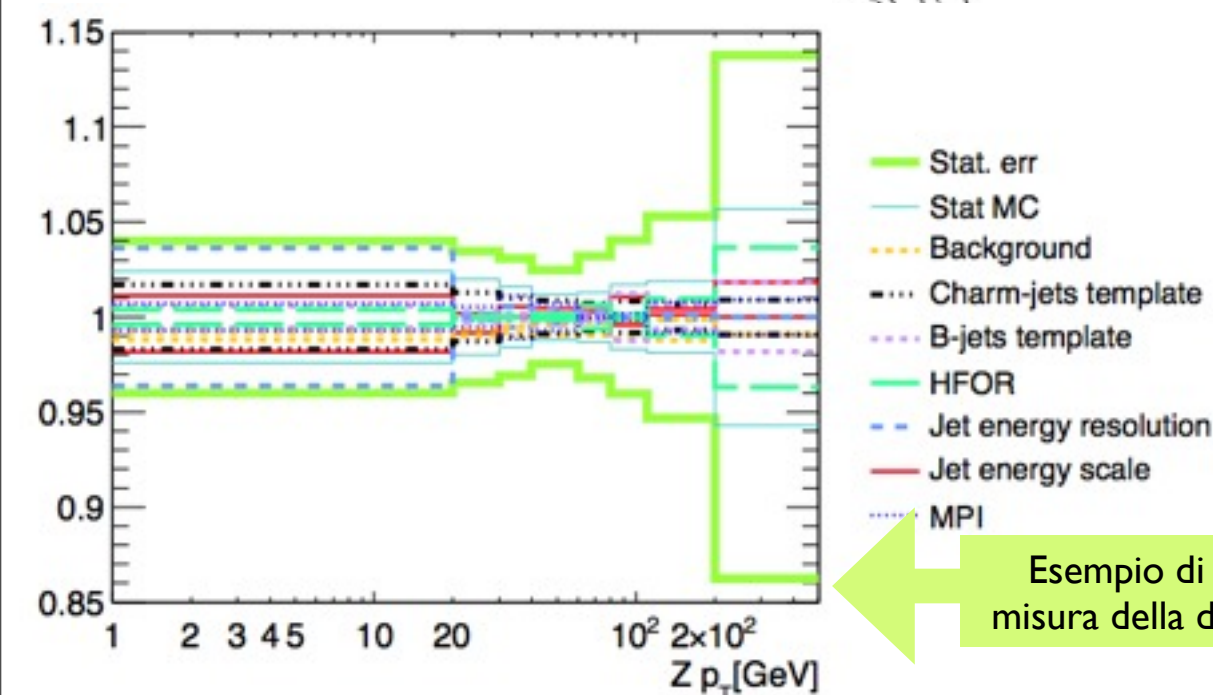
Flavor fit $\rightarrow$ $N_b - N_{bkg}$ $\leftarrow$ Flavor fit (Z+c and Z+light)
 MC (top and dibosons)
 Data driven methods (QCD)

Unfolding $\rightarrow$ $C \cdot \epsilon \cdot \mathcal{L}$

Alcuni contributi leccesi

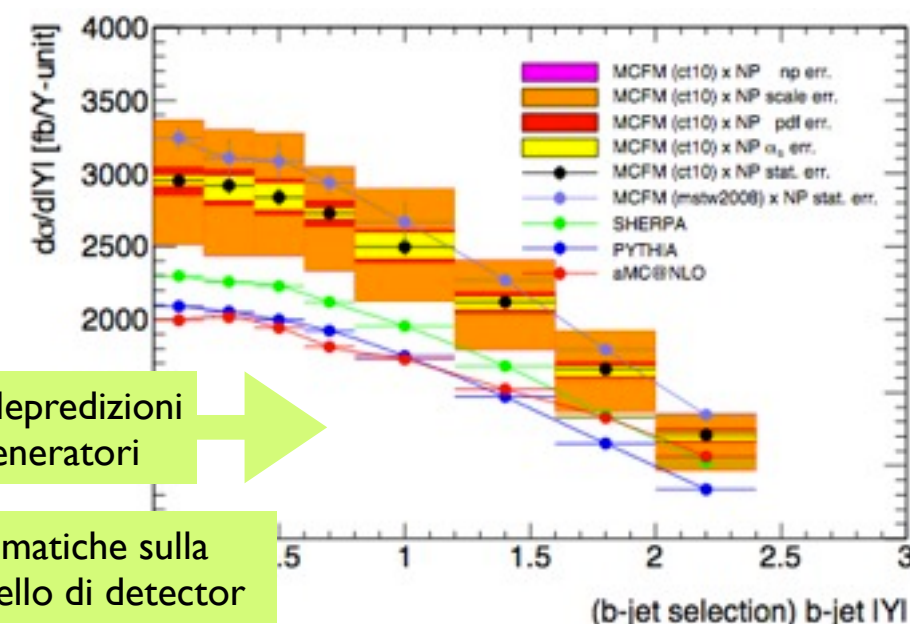


- What we measure: particle level distributions of **b-jet p_T , b-jet $|y|$, Z p_T , Z $|y|$, $DR(\text{b-jet}, Z)$, $D\Phi(\text{b-jet}, Z)$**
- Each distribution sensitive to different features of the theory predictions
- Compare the data to the theory at hadron level
 - MCFM 5FNS NLO (corrected with Sherpa and/or Pythia for NP effects)
 - aMC@NLO 4FNS NLO (+Herwig+Jimmy for shower and NP)
 - Sherpa 5FNS LO multileg (up to 4 partons)
 - Alpgen (+Herwig+Jimmy) 4FNS LO multileg (up to 5 partons)



Esempio di stima delle predizioni teoriche da vari generatori

Esempio di stima delle incertezze sistematiche sulla misura della distribuzione osservata a livello di detector





μ reconstruction efficiency at low p_T from data with J/ψ -1

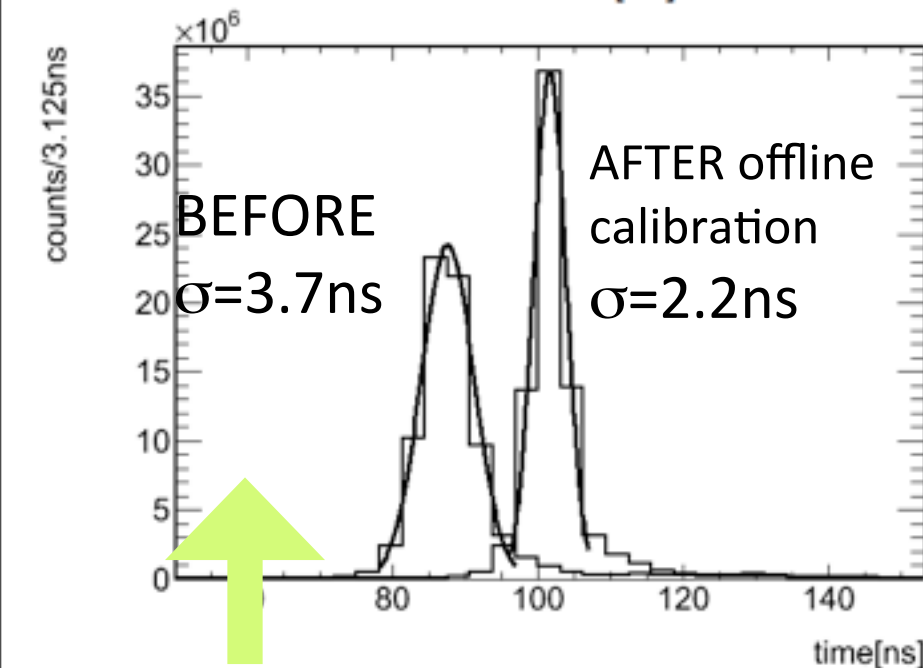
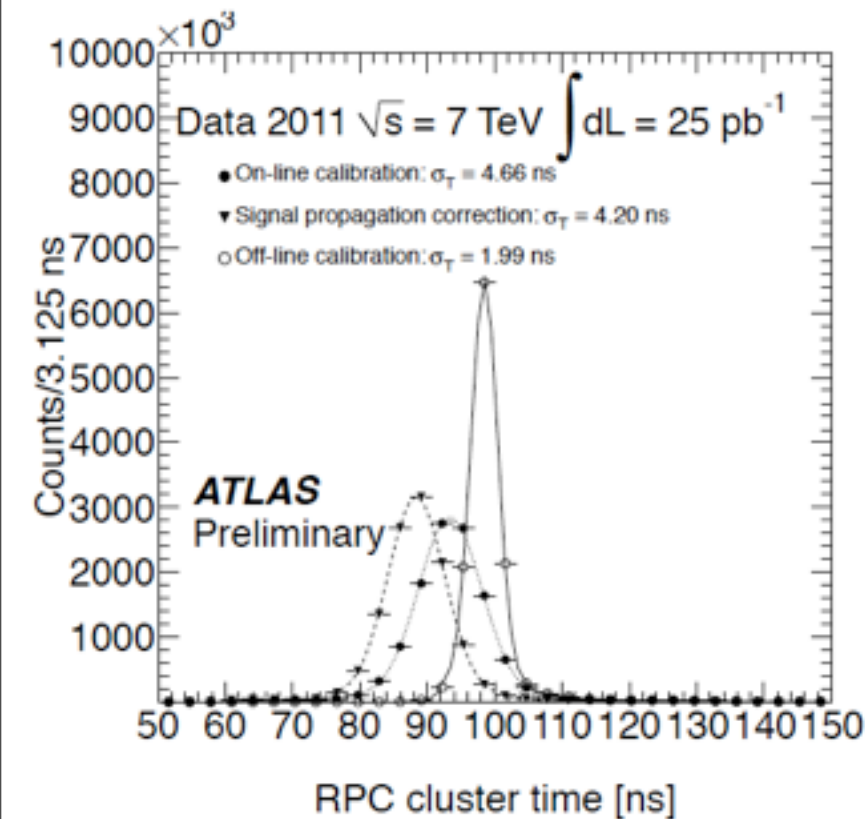
- ☐ G. Chiodini, N. Orlando, S. Spagnolo
- ☐ **misura di performance fondamentale per il programma di fisica del b, di interesse crescente nella search dell'Higgs per aumentare l'accettazione abbassando le soglie in p_T sui leptoni**
 - ☐ contributi passati: **pubblicazione per conferenze: ATLAS-CONF-2011-021** basata sui dati del 2010 ($\sim 3\text{pb}^{-1}$) **23 autori**
 - ☐ update con il processing finale dell'intero data set del 2010: condotto solo da Lecce: **ATLAS-COM-CONF-2011-192; 3 autori**; approvato come documento **ATLAS-CONF-2012-125** (Agosto 2012)
 - ☐ **articolo ATL-COM-PHYS-2012-069** basato su questi e altri risultati: "Muon Reconstruction Efficiency and Momentum Resolution of the ATLAS Experiment in Proton-Proton Collisions at $\sqrt{s} = 7\text{ TeV}$ in 2010" - approvato in ATLAS-
 - ☐ in fase di sottomissione - record CDS (interno) <https://cds.cern.ch/record/1513229>
 - ☐ studio esteso ai dati 2011 (Harward + Lecce + Indiana + CERN + Bologna + Kobe) ATL-COM-MUON-2012-013 - approvato come documento pubblico
- ☐ a testimonianza del contributo:
 - ☐ S.Spagnolo "Heavy Flavor Physics at LHC", Moriond EW 2013
 - ☐ studi futuri/in partenza di performance (risoluzione nella ricostruzione di muoni di basso impulso trasverso nel run I) Nicola O + MPI

Information		Discussion (57)	Files	Plots	Linkbacks
Report number		ATLAS-COM-CONF-2011-192			
Title		A measurement of the muon reconstruction efficiency in 2010 ATLAS data using jpsi decays			
Author(s)		Chiodini, G (INFN Lecce) ; Orlando, N (INFN Lecce and Dip. di Fisica, Univesità del Salento) ; Spagnolo, S (INFN Lecce and Dip. di Fisica, Univesità del Salento)			
Imprint		16 Nov 2011. - 15 p.			

Calibrazioni offline & MC tuning RPC ATLAS

Dimostrata risoluzione $dT=2$ ns.

Timing migliore di tutto ATLAS.



Data 2012 (preliminary)

Jinst

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SPECIAL ISSUE ON RESISTIVE PLATE CHAMBERS AND RELATED DETECTORS RPC2012

Off-line time calibration of the ATLAS RPC system

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ABSTRACT: Resistive Plate Chambers (RPC's), operated in saturated avalanche regime, are used in the Muon Spectrometer of the ATLAS experiment to produce the first level of the muon trigger in the central region, $|\eta| < 1.05$. The trigger logic, based on a coincidence of hits in three layers of detector doublets, takes advantage of the very good time resolution of these detectors which allows to easily identify the LHC bunch crossing.

- Efficienze RPC misurate nel 2011-2012 migliori di quelle del 2010 (successo degli interventi mirati in caverna)
- Time, Efficienze, Cluster Size, Noise input alle Simulazioni
- Algoritmi di misura verificati con simulazioni

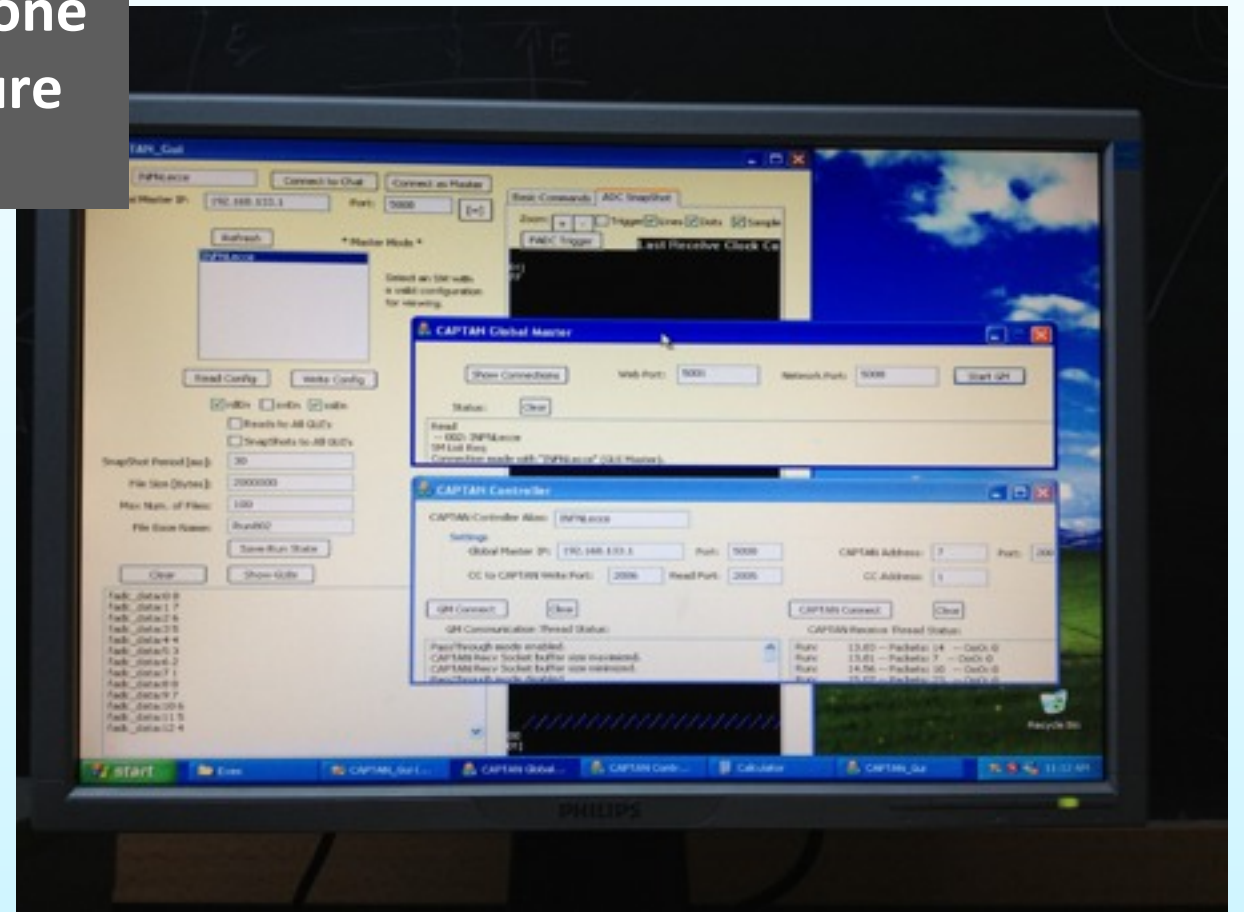
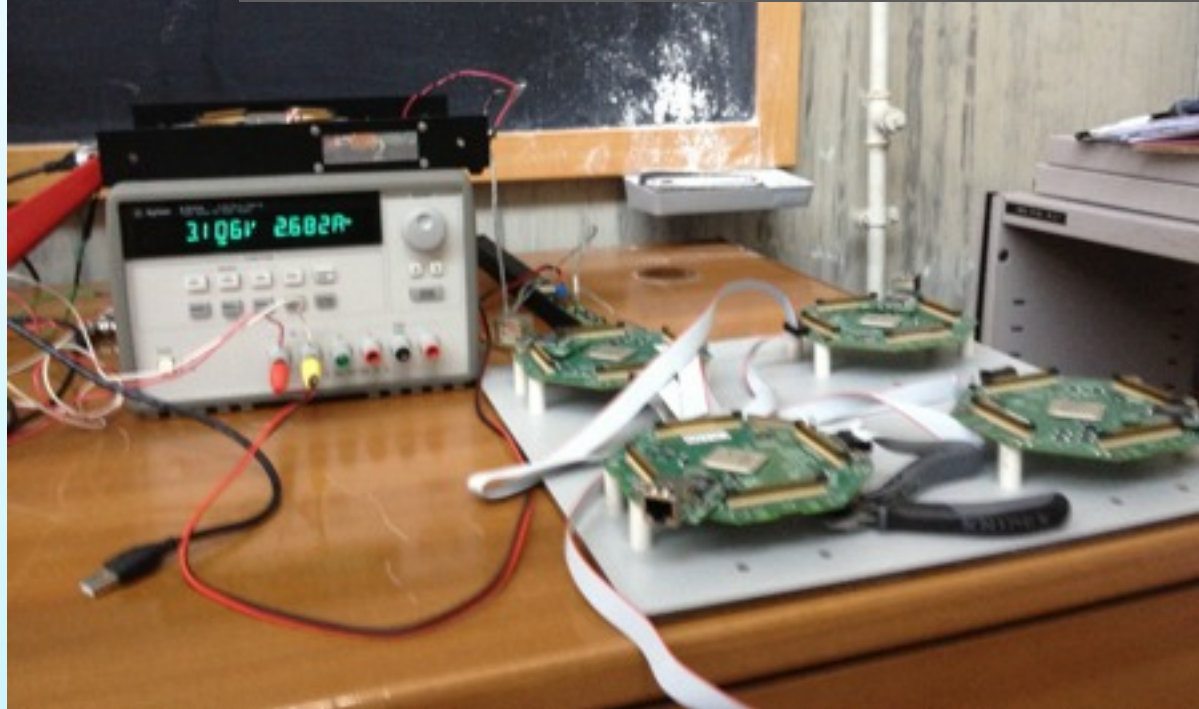
Calibrazione offline, Monte Carlo e DQ
offline RPC ATLAS
responsabilita': G. Chiodini

2013 JINST

a seguito di ... Calibrazioni offline RPC ATLAS

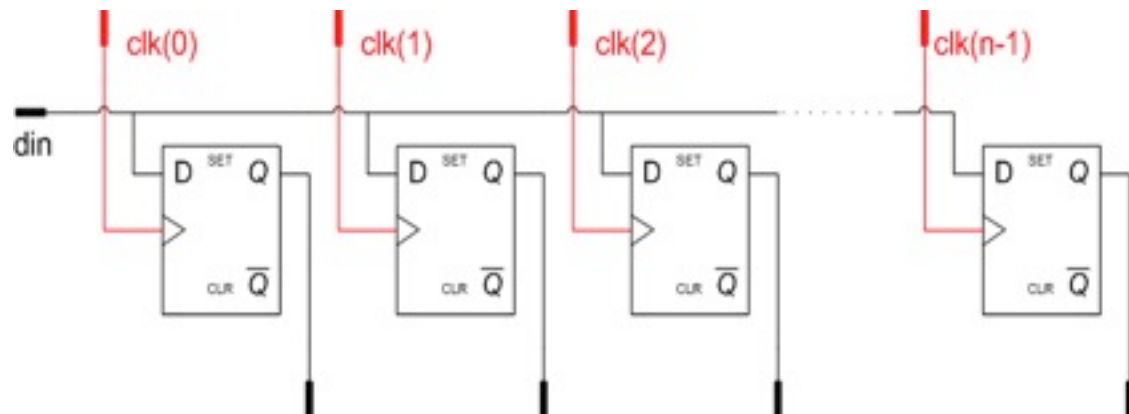
Multichannel TDC and fast timing tracker

Implementazione algoritmi di calibrazione offline RPC in FPGA per potenziali future applicazioni online



DAQ basato su FNAL CAPTAN network e Visual C++ GUI

Shifted Clock Sampling to boost dT



360 ps latch capability (**implemented**):

- Eight equally shifted DMC at 350 MHz
- TDC time width = 360 ps
- Time resolution dominated by intrinsic DMC jitter of about 120 ps

G. Chiodini, S. Spagnolo, G. Chiarello



Editorial Boards

EXOT-2012-11

[DBL - Diboson \$l\nu l\nu\$ resonance search](#)

Phase 1: Finished

Phase 2: Finished

Submission: Finished

Search for new phenomena in the WW to $l\nu l'\nu'$ final state in pp collisions at $\sqrt{s} = 7$ TeV with the ATLAS detector

Leading Group: EXOT

Other Groups:

Contact editors: Else Lytken, Junjie Zhu, Koji Terashi, Lulu Liu, Sara Borroni

Subgroup: EXOT-DBL

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EdBoard Chair: Lucia Di Ciaccio

TOPQ-2011-16

[top cross section \$l\$ +jets \$b\$ -tagged and \$R_b\$](#)

Phase 1: Active

Phase 2: Not Started

Submission: Not Started

Measurement of the top-quark pair cross-section in the single lepton channel with b -tagging information and simultaneous extraction of R_b

Leading Group: TOPQ

Other Groups:

Contact editors: Agnieszka Leyko, Aurelio Juste Rozas, Francesco Spano, Jeffrey Ford Garberson, Jordi Nadal, Lluisa-Maria Mir, Markus Cristinziani

Subgroup: TOPQ-XSECTION

Editorial board: Jason Nielsen, John Butler, LianLiang Ma, Stefania Spagnolo

EdBoard Chair: Jason Nielsen

ATLAS-CONF-2013-015

[DBL - Diboson \$l\nu l l\$ resonance 8 TeV](#)

Phase 1: Finished

Search for heavy resonance decaying to WZ to $l\nu l l$

Leading Group: EXOT

Editors: Else Lytken, Junjie Zhu, Koji Terashi, Marjorie Shapiro, Martina Hurwitz, Peter Loscutoff

Other Groups:

Contact editors: Else Lytken, Georges Azuelos, Junjie Zhu, Koji Terashi, Marjorie Shapiro, Martina Hurwitz, Peter Loscutoff

EdB Chair: Charles Young

Editorial board: Charles Young, Lucia Di Ciaccio, Mark Neubauer, Stefania Spagnolo

ATLAS-CONF-2013-006

[Performance of the 2011 tau trigger](#)

Phase 1: Finished

Performance of the ATLAS tau trigger in 2011

Leading Group: TRIG

Editors: Cristobal Cuenca Almenar, Mansoor Shamim, Phillip Urquijo, Soshi Tsuno

Other Groups:

Contact editors: Maria Pilar Casado, Soshi Tsuno

EdB Chair: Sarah Demers

Editorial board: Martin Aleksa, Sarah Demers, Stefania Spagnolo

ATLAS-CONF-2012-068

[DBL - Diboson \$l\nu l\nu\$ resonance search](#)

Phase 1: Finished

Search for heavy resonance decaying to WW to $l\nu l\nu$ for ICHEP

Leading Group: EXOT

Editors: Junjie Zhu, Lulu Liu, Sara Borroni

Other Groups:

Contact editors: Else Lytken, Junjie Zhu, Koji Terashi, Lulu Liu, Sara Borroni

EdB Chair: Lucia Di Ciaccio

Editorial board: Ivor Fleck, Lucia Di Ciaccio, Mark Neubauer, Stefania Spagnolo



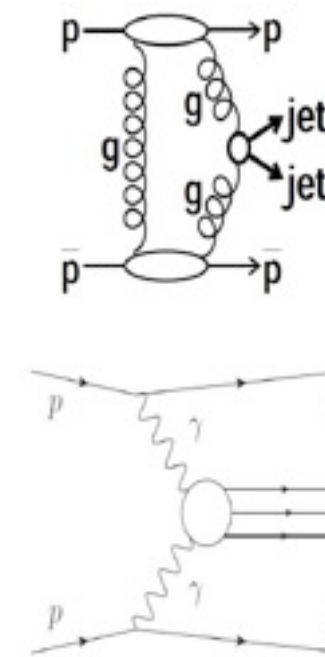
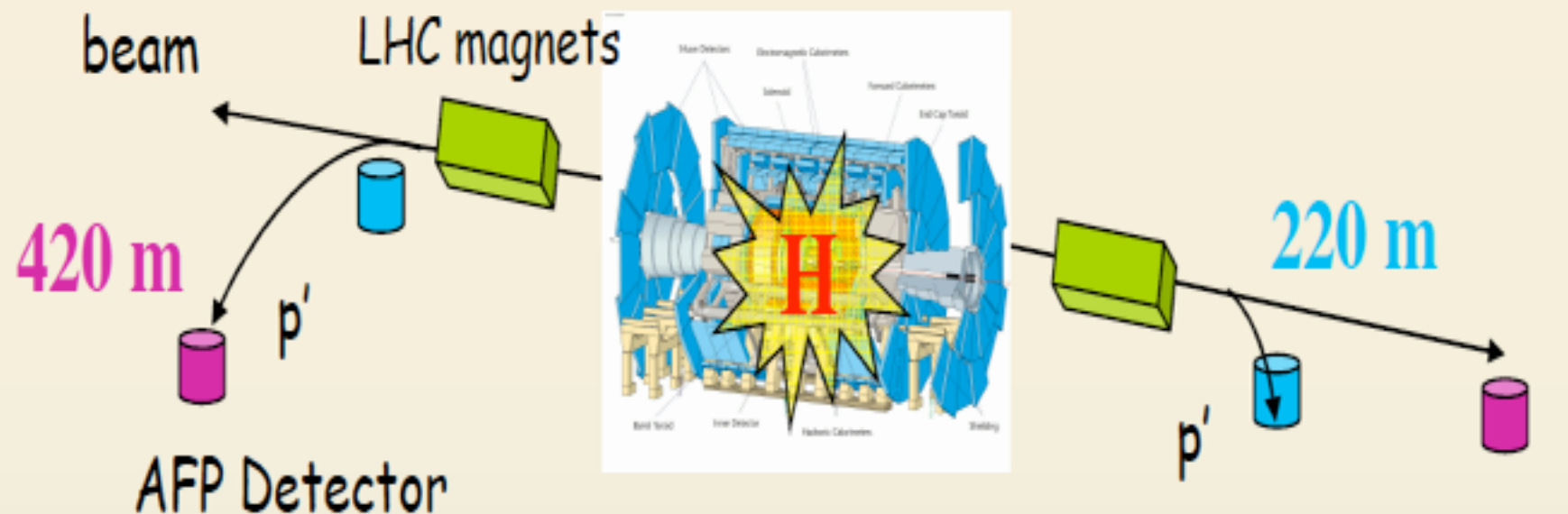
ATLAS FORWARD PHYSICS (AFP)

G. Chiodini, S. Spagnolo

Central produced events with both intact protons from IP

AFP220 is part of ATLAS Lol upgrade for phase 1 (CERN-LHCC-2011-012)

not yet approved



Diffractive QCD
Higgs (for AFP420)
and
e.w. processes:
BSM objects
anomalous gauge
couplings,
TGC and QGC

- 2 arms detector fully integrated in ATLAS DAQ, Trigger
- 2 detectors for each arm
- edgeless 3D pixels to tag protons and measure M of the central system
- Fast timing detector to suppress LHC pile-up with 10 ps dt: $dz = (z_1 - z_2)dt/c = 2.1\text{mm}$

Proposta di LECCE ad AFP-ATLAS impiego rivelatori al diamante per timing come alternativa all'attuale base-line (quarzo letto da MCP):

- prima proposta [Aug. 2012 AFP timing internal review](#);
- contributo piu' recente a [AFP Collaboration meeting](#) 18 Giugno 2013
- Interessi di Lecce, Roma2, Bologna
- Idea riportata da upgrade di CMS-TOTEM (CERN-LHCC-2013-009 ; LHCC-P-007) senza nessun dettaglio