

# Status report analisi Atlas Napoli



**10/05/2016**

**F. CONVENTI**

# Analisi ATLAS Napoli

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- **(b)Jet+MET**

Francesco C., Francesco Cirotto, Arturo, Elvira, Marco Lavorigna (laureando), Mariaelena D'Errico (laureanda)

- **Search high mass  $X \rightarrow ZZ \rightarrow qqll/vvll$**

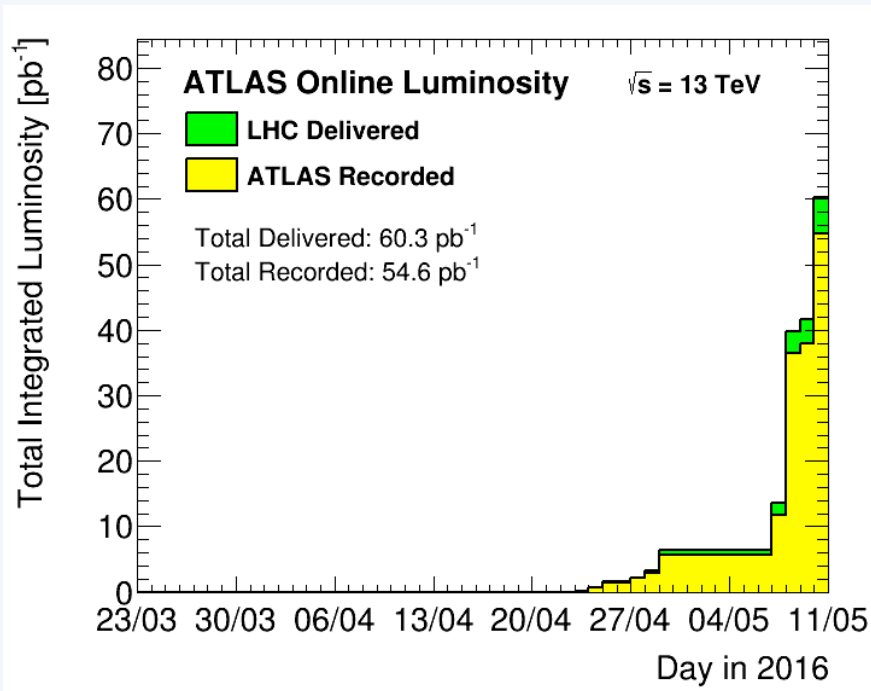
Francesco C., Elvira, Arturo  
Antonio Giannini (laureando)

- **Prossimo laureando:**

Claudio Calamita

# Atlas 2016 data

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For **ICHEP**, finalize dataset **2 to 10**  $\text{fb}^{-1}$  (including 2015 data).

## Physics Analysis milestones:

- Jun 6: review analyses w 20.7.5.4 derivations.
- Jun 28: unblind all analyses
- Jul 8: physics jamboree (WG approvals prior)
- Jul 18: P&P week, approvals only.

(ICHEP in Chicago from the 3rd to the 10th August 2016

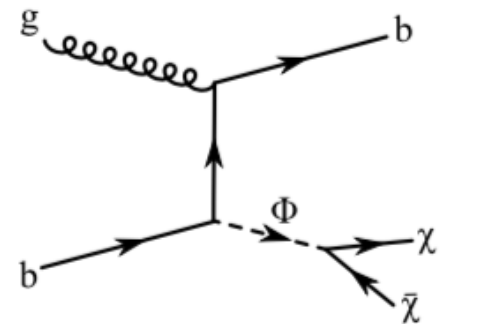
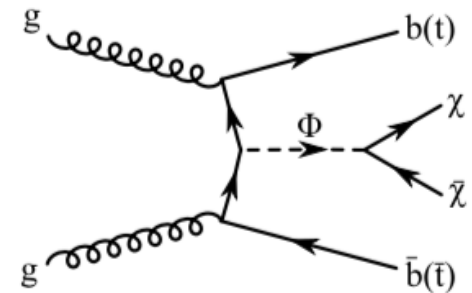
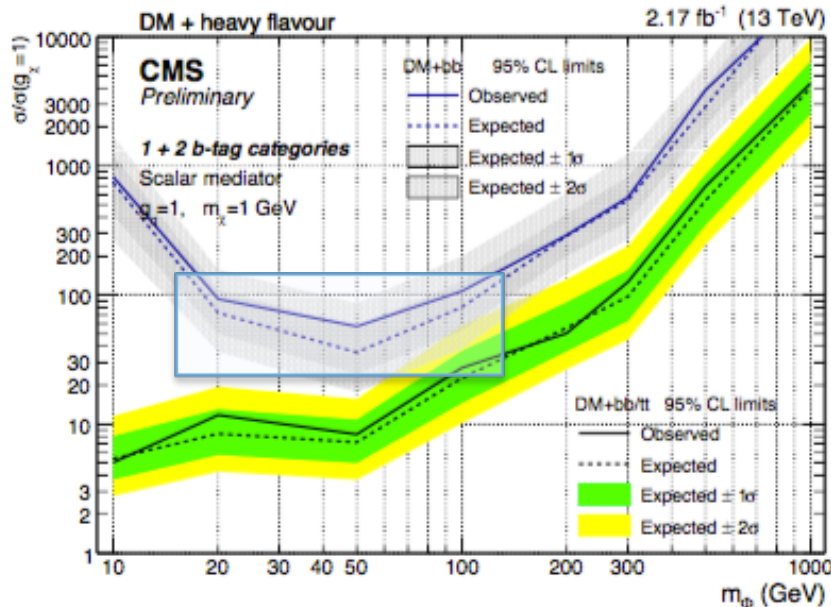
<https://www.ichep2016.org/>)

# bjet+MET (mono-b)

Weekly meeting: Lunedì 11.00

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- Francesco C., Francesco Ciotto, Arturo, Elvira, Marco L.
- Ricerca di nuova fisica: principali interpretazioni in DM e SUSY
- ATLAS (e CMS) utilizzano per il RUN-II modelli semplificati con presenza di mediatore  $\phi$  (per il Run-I sono state utilizzate EFT)



- Effective theory is only valid if  

$$Q_{\text{transfer}} < M = \sqrt{g_\chi g_q} \Lambda < 4\pi \Lambda$$
- At the LHC  $Q_{\text{transfer}} \propto p_{T,\text{jet}}$

# bjet+MET (mono-b)

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ATLAS NOTE  
May 10, 2016



Not reviewed, for internal circulation only

1 Search for Dark Matter associated production with bottom quarks with  
2  $pp$  collision at  $\sqrt{s} = 13$  TeV with the ATLAS detector at the LHC

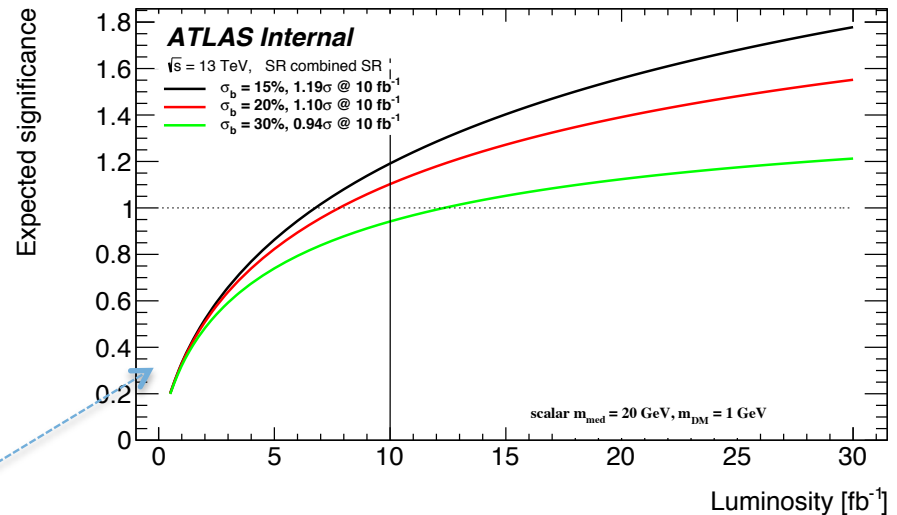
3 H. Abreu<sup>a</sup>, Y. Afik<sup>a</sup>, F. Crotto<sup>b</sup>, F. Conventi<sup>b</sup>, C. Giuliani<sup>c</sup>, E. Gonzani<sup>d</sup>, J. Gramling<sup>d</sup>,  
4 V. Ippolito<sup>e</sup>, F. Meloni<sup>i</sup>, P. Pani<sup>f,g</sup>, M. Rescigno<sup>b</sup>, E. Rossi<sup>b</sup>, Y. Rozen<sup>a</sup>, A. Shcherbakova<sup>f,g</sup>,  
5 M.E. Stramaglia<sup>i</sup>, F. Ungaro<sup>i</sup>

- Goal: Analisi pronta per ICHEP (2-10 fb<sup>-1</sup>)
- Internal note e' in preparazione e su CDS (EB richiesto)
- Analisi per data 2015(3,5 fb<sup>-1</sup>) e'  $\approx$ ok
- Molto lavoro/poco tempo per analisi 2016  $\rightarrow$  ICHEP



Limite attuale (CMS) e' ordine 10 volte piu' alto

Exp Significance (scalar  $\phi_{20\_}\chi_1$ ,  $g=3,5$ )

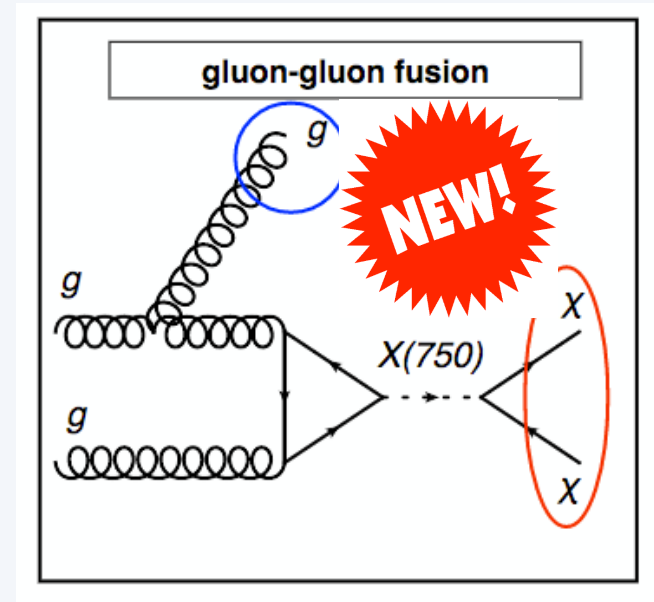
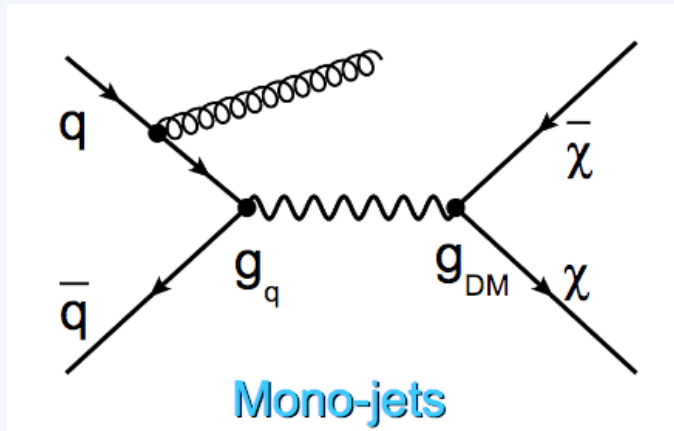


# Jet + MET (monojet)

Weekly meeting: Mercoledì 13.30

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- Francesco C., Francesco Ciotto, Arturo, Elvira, Mariaelena D'Errico
  - Goal: Analisi pronta per ICHEP (2-10 fb<sup>-1</sup>)  
Analisi in pubblicazione per i dati 2015  
<http://arxiv.org/abs/1604.07773>
  - Ricerca di nuova fisica, principali interpretazioni in:  
DM, SUSY, ExtraDimensions and **H(750)**



# Jet + MET (monojet)

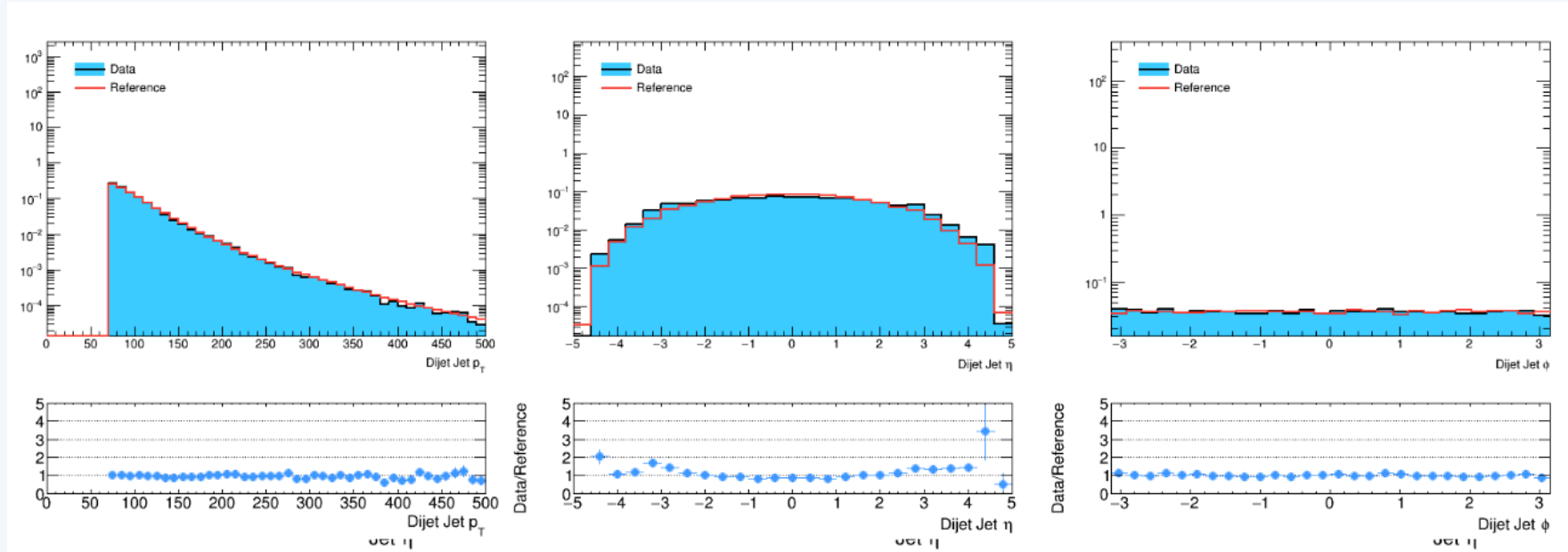
7

- 2016 data: Run 297170

data16\_13TeV.

00297170.physics\_Main.merge.AOD.f686\_m1583

- Good Jet / Dijet Selection
  - At least 2 jets with  $p_T > 70$  GeV
  - $\Delta\phi > 3$  between two leading jets
  - Leading jets balanced in  $p_T$ 
    - $(p_{T1} - p_{T2})/(p_{T1} + p_{T2}) < 0.3$



[https://indico.cern.ch/event/523776/contributions/2155242/attachments/1266495/1874997/Data16\\_Jets2.pdf](https://indico.cern.ch/event/523776/contributions/2155242/attachments/1266495/1874997/Data16_Jets2.pdf)

# Search of high mass resonances in final state with 2leptons and 2quarks: Moriond Results

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## Latest public results:

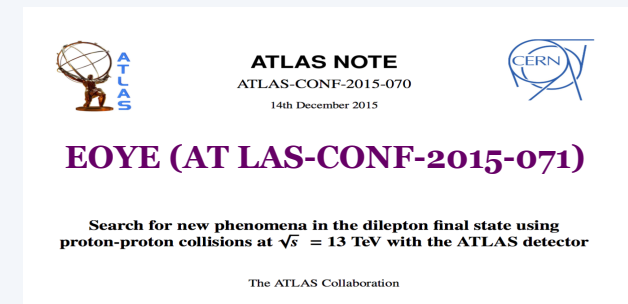
**EOYE (AT LAS-CONF-2015-071):** boosted-only analysis, focused on exotics signals, motivated by Run 1 excess

**Moriond (ATLAS-CONF-2016-016):** resolved + boosted, boosted analysis re-optimized for H, motivated by  $\gamma\gamma$  Run 2 excess

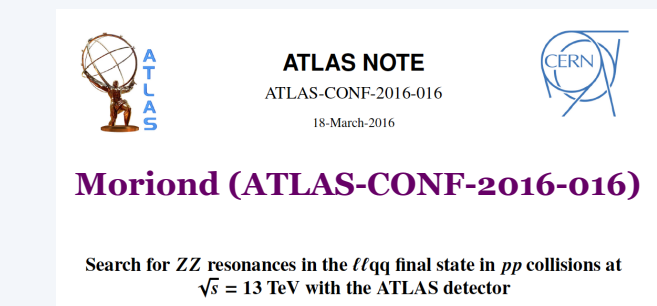
## Napoli's Group Contribution:

- ✳ background modeling uncertainties: Study on modeling from different MC generators
- ✳ Definition of the selection: optimization of the signal/BKG ratio
- ✳ Support, management and production of official samples for the  $llqq$  and  $nunuqq$  analyses in the context of the CxAOD Framework group

<https://atlas.web.cern.ch/Atlas/GROUPS/PHYSICS/CONFNOTES/ATLAS-CONF-2015-071/>



<https://atlas.web.cern.ch/Atlas/GROUPS/PHYSICS/CONFNOTES/ATLAS-CONF-2016-016/>



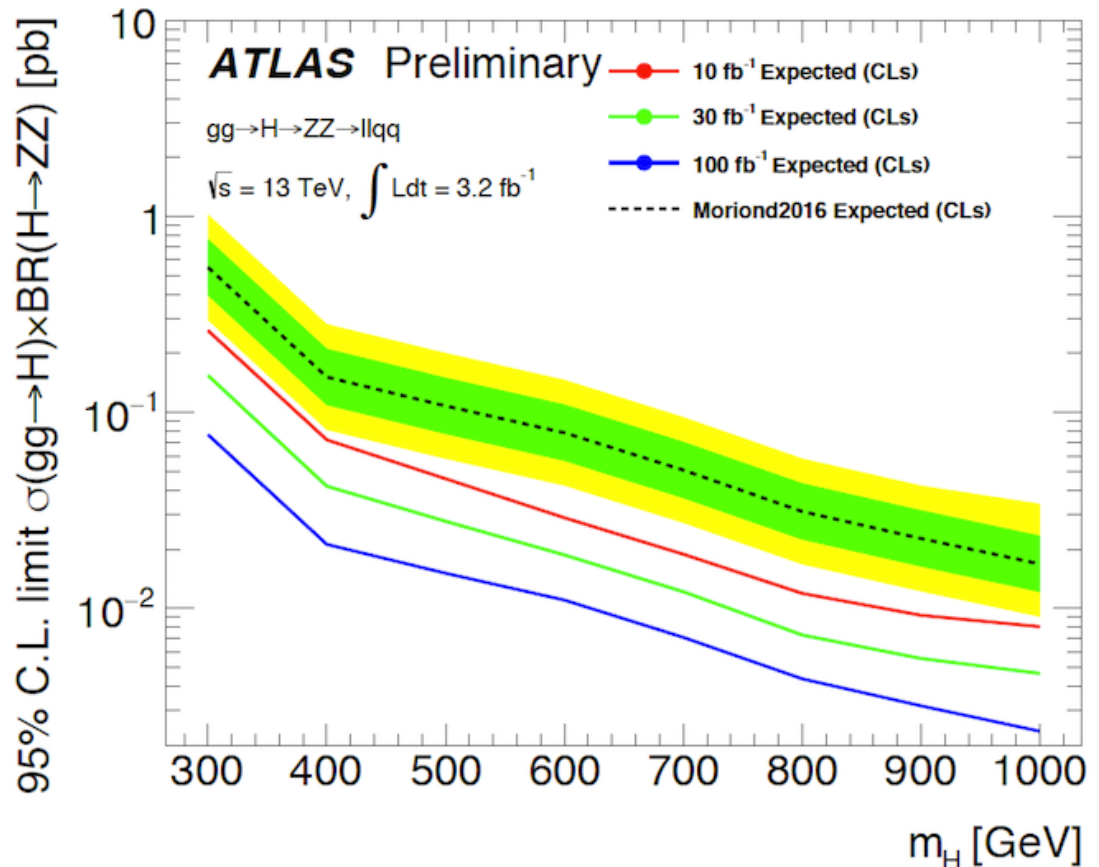
# Search of high mass resonances in final state with 2leptons and 2quarks: Summer Conferences

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## New Big Group VV/ VH joint Higgs/ Exotics

### Napoli's Group Contribution:

- Antonio Giannini (master student)
- Definition of the VBF selection and Event Selection Optimization
- Continuing in the support, management and production of official samples in the context of the CxAOD Framework group



# Mono-X; X=[W,Z,H]

## Mono-W/Z: Exotic Group Approval

Elisabetta Barberio<sup>a</sup>, Kevin Bauer<sup>b</sup>, Amelia Brennan<sup>a</sup>, Gianpaolo Carlino<sup>g</sup>, Shih-Chih Hsu<sup>c</sup>,  
Laser Kaplan<sup>d</sup>, Francesco Lo Sterzo<sup>e</sup>, Xuanhong Lou<sup>f</sup>, Samuel Meehan<sup>c</sup>, Andy Nelson<sup>b</sup>, Dilia  
Maria Portillo Quintero<sup>i</sup>, Arturo Sanchez<sup>g</sup>, Chase Shimmin<sup>b</sup>, Chao Wang<sup>e,h</sup>, Jake Wang<sup>f</sup>,  
Song-Ming Wang<sup>c</sup>, Wei Wang<sup>e,h</sup>, Daniel Whiteson<sup>b</sup>, Sau Lan Wu<sup>d</sup>

Presentation Approval May 2<sup>nd</sup>:

<https://indico.cern.ch/event/525561>

Current status of the paper:

<https://cds.cern.ch/record/2129160>

## Mono-Higgs Timeline

- No mid-term result with partial dataset → Skip ICHEP
- Aim for single result in December → Paper for EOYE
- Why?
  - This will make for a stronger result and allow team members to contribute to performance work throughout year.

Presentation Approval May 4<sup>th</sup>:

<https://indico.cern.ch/event/517991>

Current status of the paper:

[https://svnweb.cern.ch/trac/atlasphys-exo/  
browser/Physics/Exotic/JDM/monoHbb/  
Run2/trunk/Paper/monoHbb\\_paper.pdf](https://svnweb.cern.ch/trac/atlasphys-exo/browser/Physics/Exotic/JDM/monoHbb/Run2/trunk/Paper/monoHbb_paper.pdf)

## CxAOD Framework Note:

- Actively working in the development and edition of the note
- Framework to be used for ~20 teams/analysis in ATLAS

source: PhysicsAnalysis / HiggsPhys / Run2 / Hbb / CxAODFramework / Documentation / trunk

| Name             | Size      | Rev    | Age      | Author      | Last Change                                                   |
|------------------|-----------|--------|----------|-------------|---------------------------------------------------------------|
| acknowledgements |           | 718296 | 4 months | enricorange | Initial import. Use the default ATLAS template                |
| bibliex          |           | 718296 | 4 months | enricorange | Initial import. Use the default ATLAS template                |
| journal          |           | 718296 | 4 months | enricorange | Initial import. Use the default ATLAS template                |
| template         |           | 718296 | 4 months | enricorange | Initial import. Use the default ATLAS template                |
| CxAODDoc.bib     |           | 718296 | 4 months | enricorange | Initial import. Use the default ATLAS template                |
| CxAODDoc.tex     |           | 718296 | 4 months | enricorange | Initial import. Use the default ATLAS template                |
| CxAODDoc.pdf     |           | 718296 | 4 months | enricorange | Initial import. Use the default ATLAS template                |
| extension.tex    | 107 bytes | 718279 | 4 months | enricorange | New layout for the note                                       |
| introduction.tex | 115 bytes | 718279 | 4 months | enricorange | New layout for the note                                       |
| workflows.tex    | 487 bytes | 718279 | 4 months | enricorange | New layout for the note                                       |
| overview.tex     | 5.5 kb    | 720502 | 3 months | fruseller   | Added table with overview of handlers, description for ...    |
| CxAODDoc.tex     | 8.2 kb    | 720502 | 4 weeks  | arturo      | Including in the main tex the useful library and test figures |
| CxAODDoc.pdf     | 305.6 kb  | 720502 | 4 weeks  | arturo      | Including in the main tex the useful library and test figures |

# News

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- **1 Atlas talk per Arturo:**
- SantanderDM2016, Santander, Spain, from Monday, June 27, 2016 to Friday, July 1, 2016. The title of this ATLAS talk is  
Dark Matter searches with Mono-X signatures at the ATLAS detector
- **1 talk pp@LHC: 16-18/05 Pisa2016:** Higgs Exotics (F. Ciotto)
- **Sottomessi 2 abstract per SIF2016 Padova:**
- 1) Ricerca di risonanze ad alta massa in processi con due leptoni e due jet nello stato finale nell'esperimento ATLAS (**Antonio**)
- 2) Ricerca di fisica oltre il Modello Standard in processi con b-jet ed energia mancante nello stato finale nell'esperimento ATLAS (**Marco**)