Updated IBL Geo Validation:
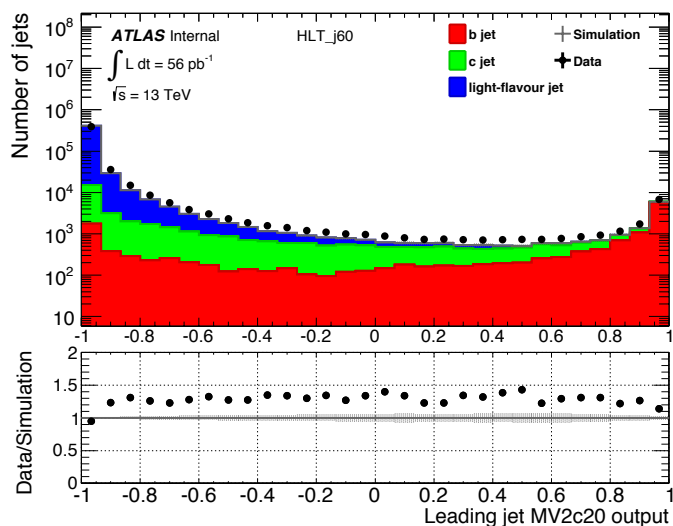## *Looking at ATLAS-R2-2015-03-15-00*

Laurie McClymont,

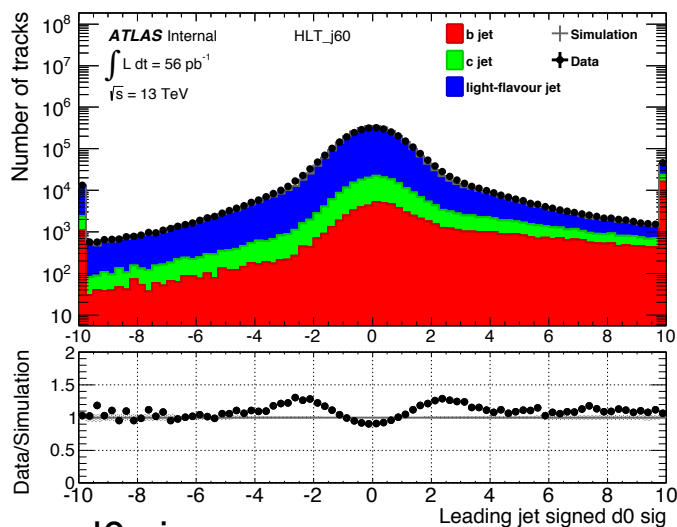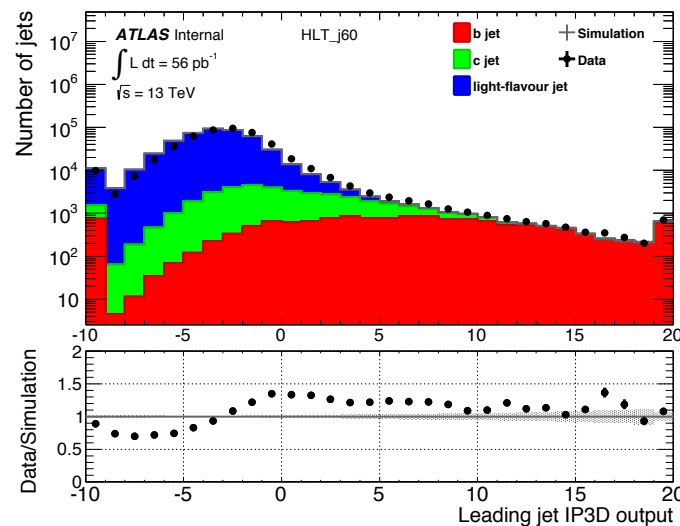Flavour Tagging Group

Algorithm Meeting

11/02/16

- Early Data/MC comparisons of key b-tagging variables in early Run-2 dijet events.
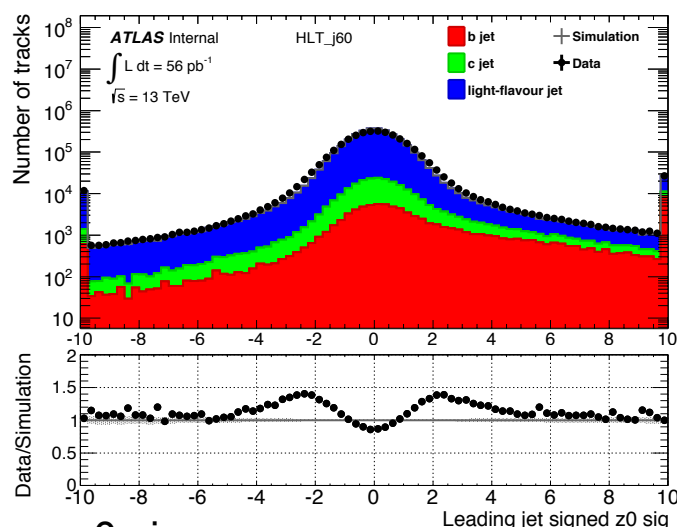- There were some discrepant results ...

MV2c20
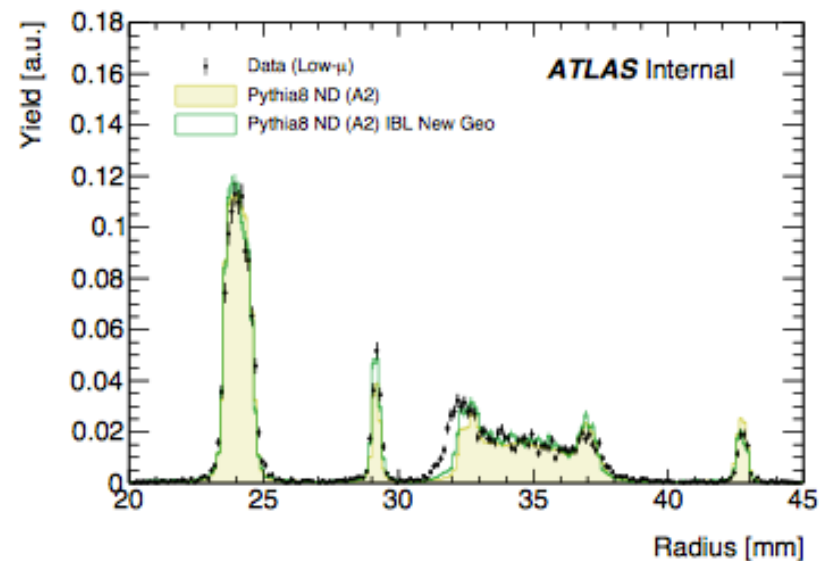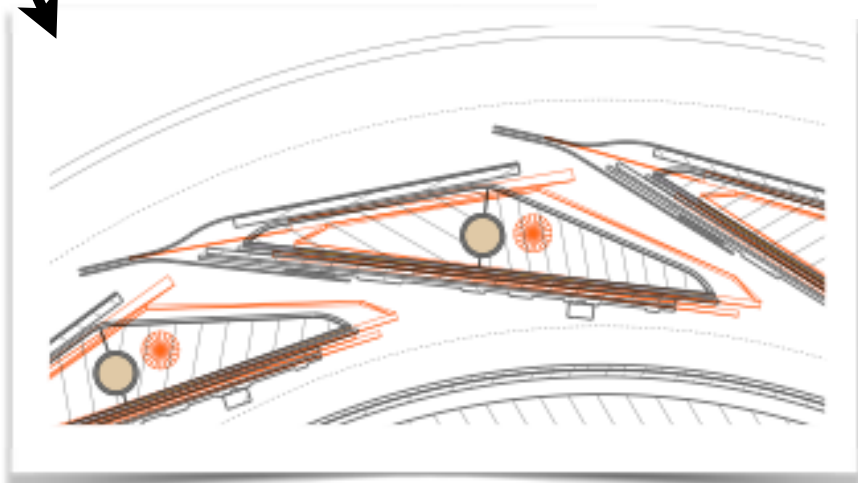
IP3D

d0 sig

z0 sig

Problems

- Imperfect alignment (high pT)

- Geometry tag missing 23% IBL material (low pT)
  - New Geo. Tag Produced and validated.

- Angle of overlap issue

Simone Pagan Griso, Heather Gray

https://indico.cern.ch/event/433839/contribution/6/attachments/1128840/1612854/PC_20jul.pdf

GEO Model
IBL

- New Tag Produced: ATLAS-R2-2015-03-**15**-00_VALIDATION

- Need to confirm that we see reasonable results in ttbar events

- Then we will request a new dijet MC to compare to data.

- Updated Geo Tag: - ATLAS-R2-2015-03-**15**-00_VALIDATION

- Grey line in plots, also shown as coloured stack of flavour fractions.

- ttbar events
- pileupFinalBunch = 0

"valid1.110401.PowhegPythia_P2012_ttbar_nonallhad.merge.e3099_s2781_r7465_p2494"

- Validated Geo Tag: ATLAS-R2-2015-03-**01**-00_VALIDATION
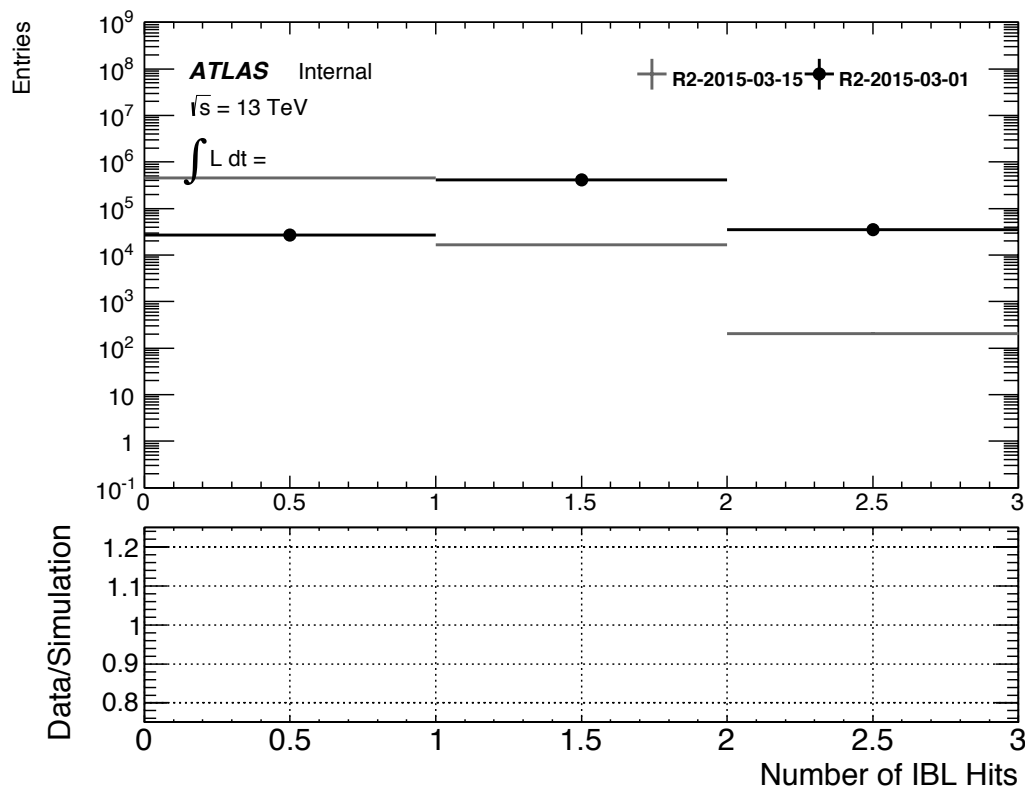
- Black markers in plots

- ttbar events
- pileupFinalBunch = 6

"valid1.110401.PowhegPythia_P2012_ttbar_nonallhad.recon.AOD.e3099_s2578_r7058_tid06432679_00"

- We are using NTuples created using Run2BTagOptimisationFramework
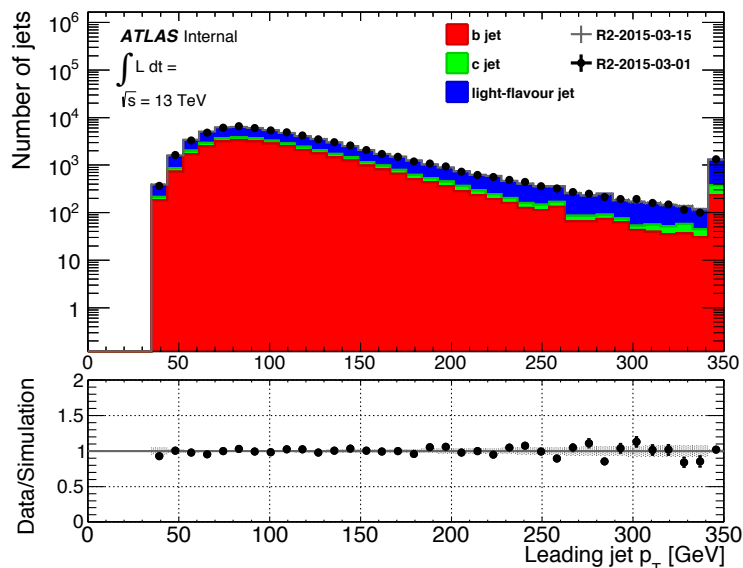
- **For a different production**
  - Problem with # IBL hits
  - Large number of 0 hit where hit is expected.

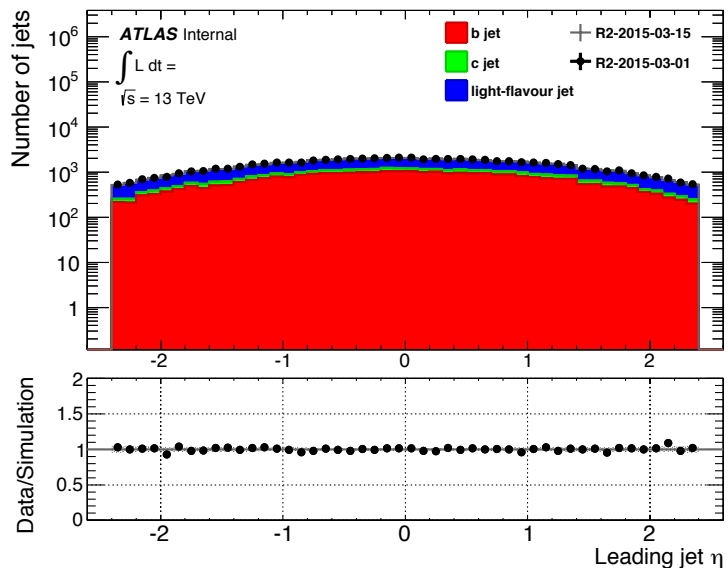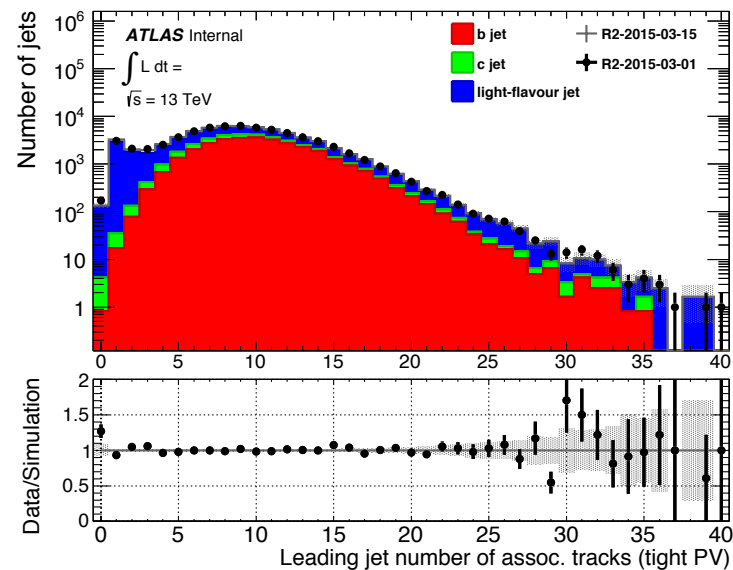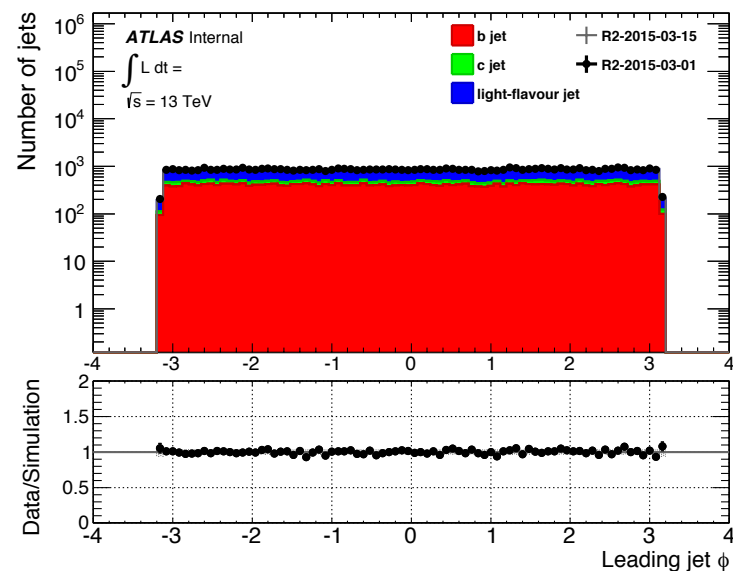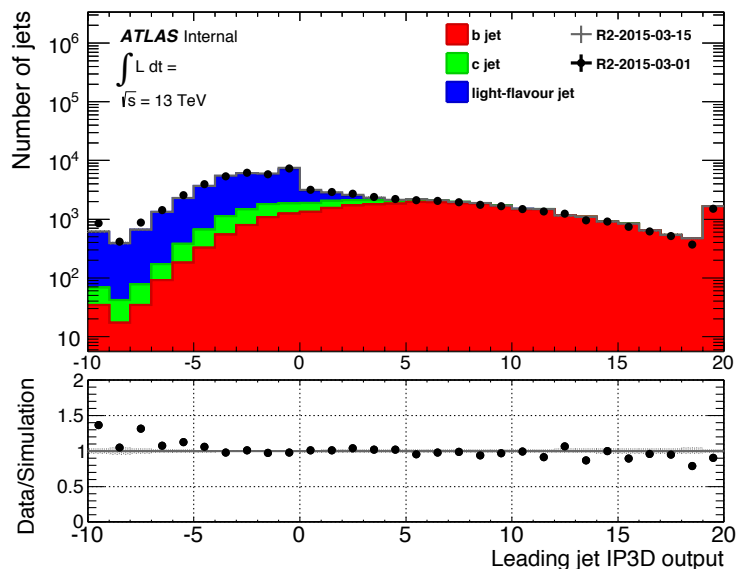- **Don't panic! This is not the newest production**

Jet pT

Sum Track P$_T$

Eta
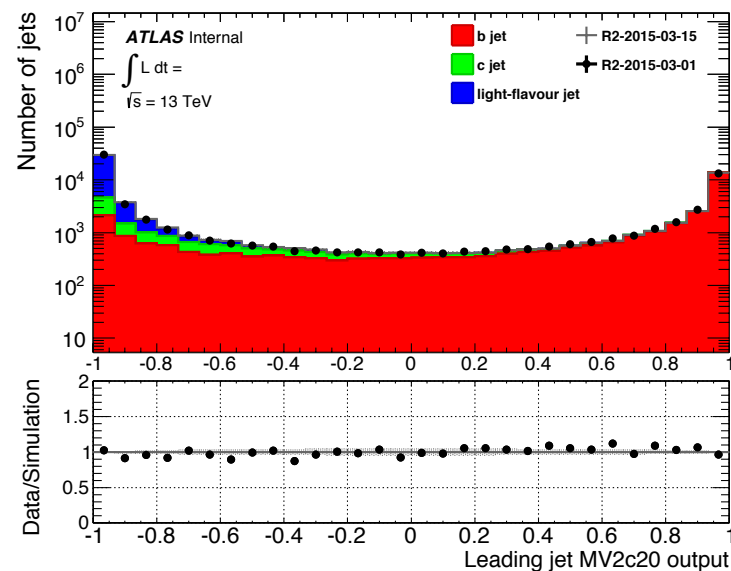
Phi

IP3D

SV1
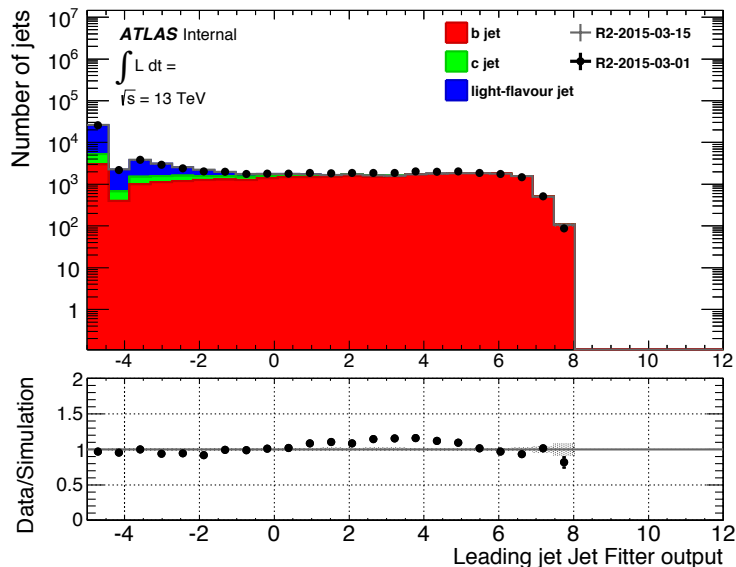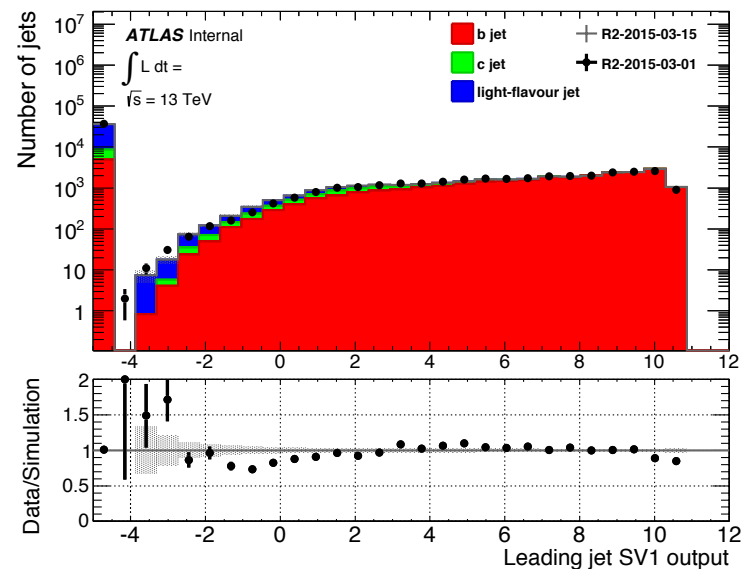
Jet fitter

MV2c20

d0
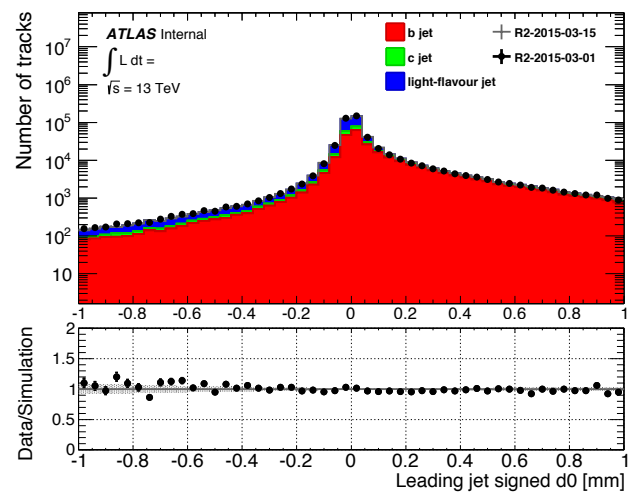
d0 Err
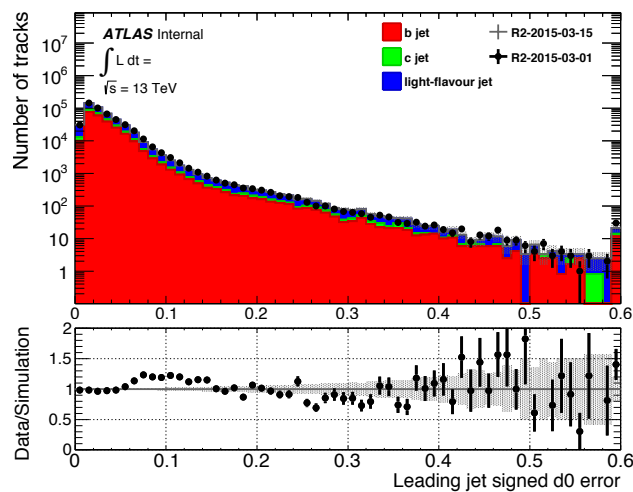
d0 Sig
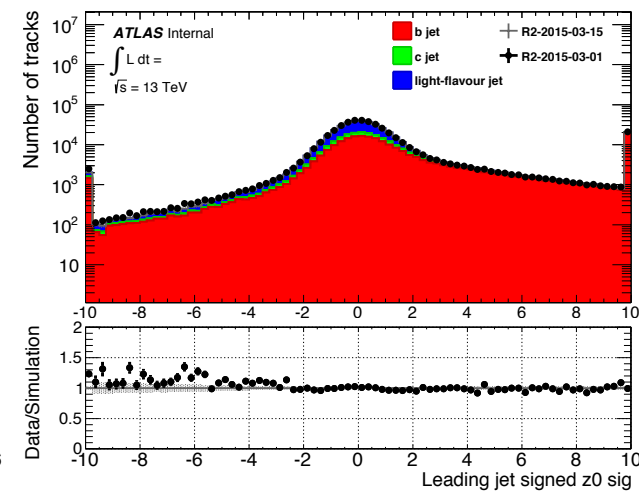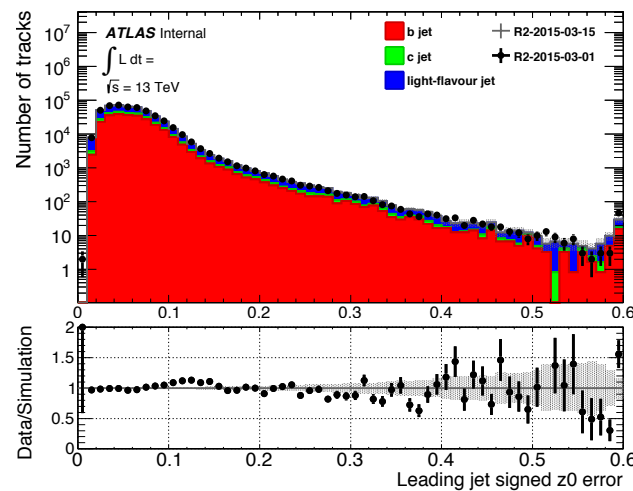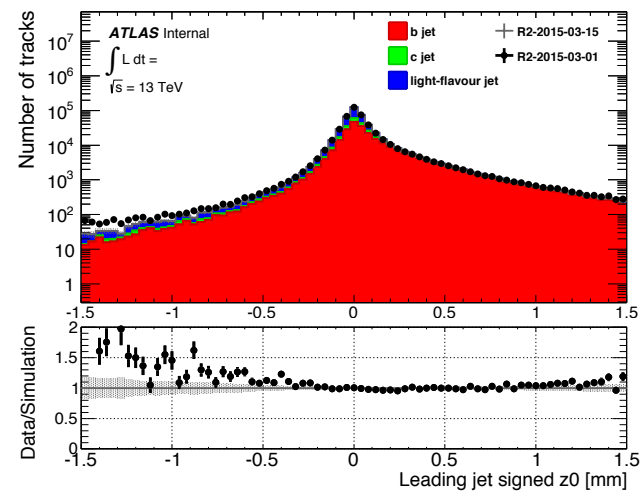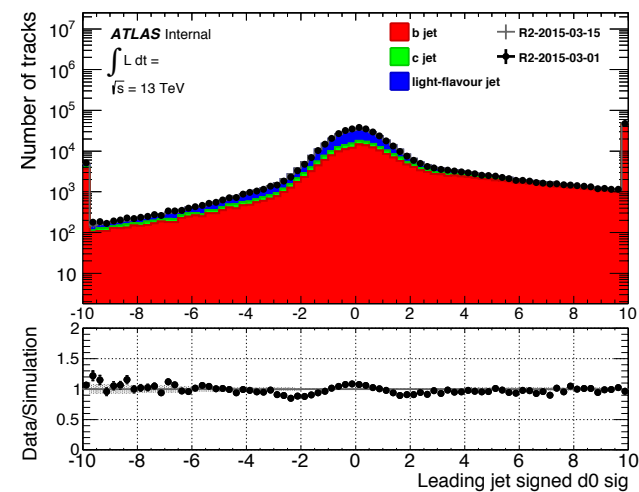
z0

z0 Err

z0 sig

IBL Hits
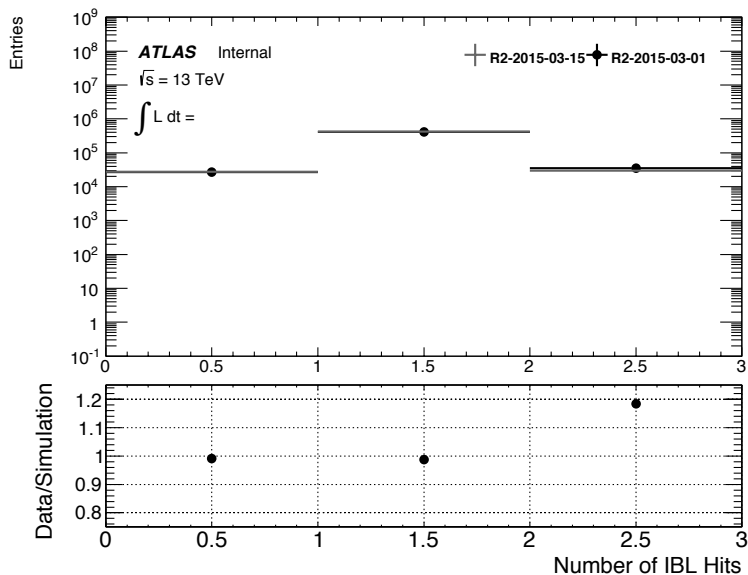
IBL Hits vs. track pT
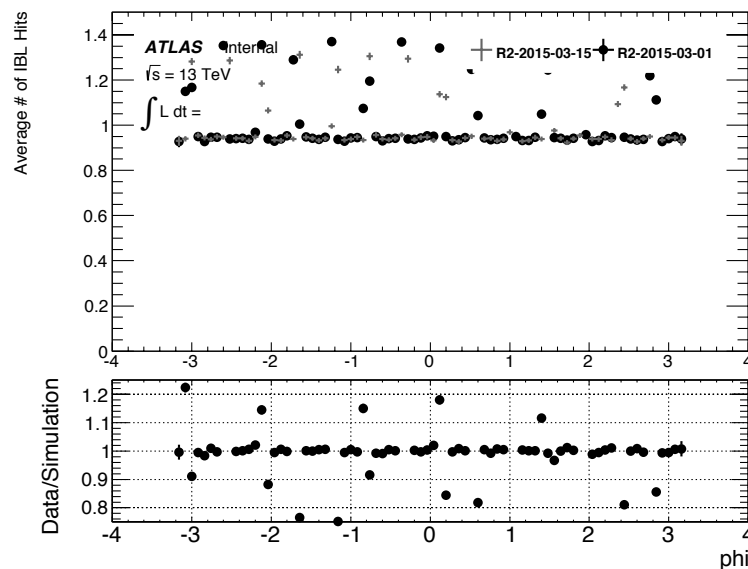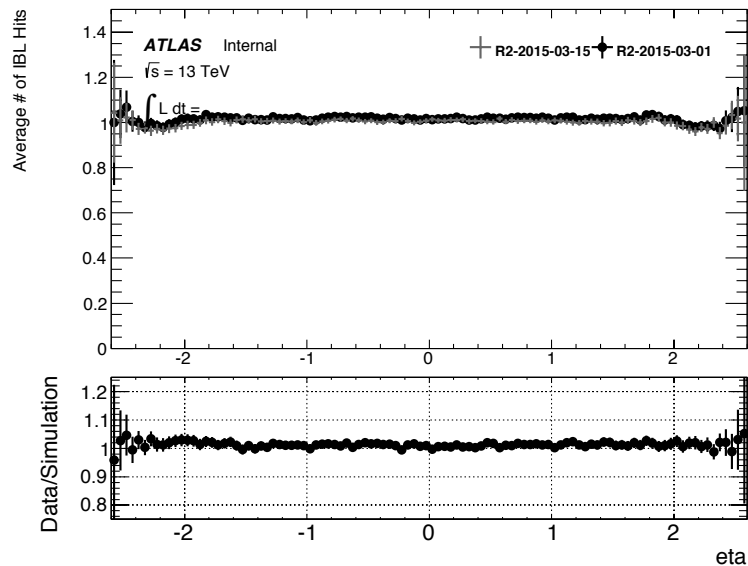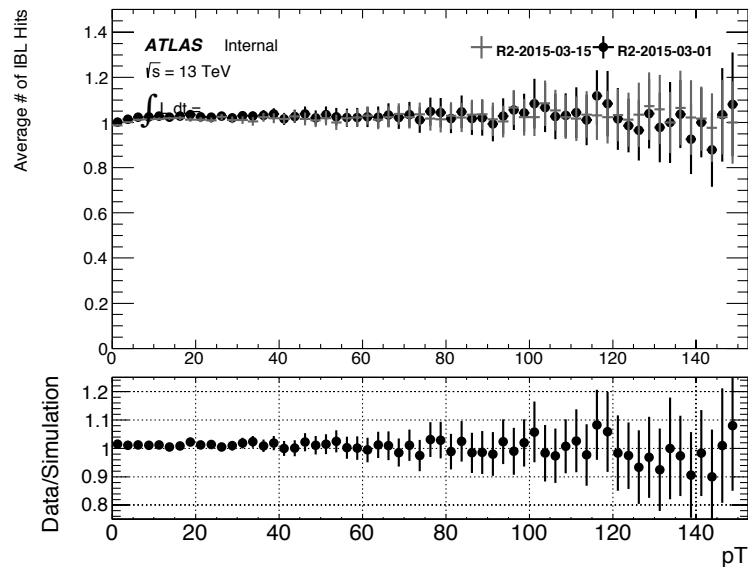
IBL Hits vs. η

IBL Hits vs. Φ

IP3D Grades:
Tracks split into 14 categories
- shown on right

0 - 0In0NIn_EInENIn: no hit in first 2 layer and both expected

1 - 0In0NIn_EIn: no hit in first 2 layer and expected in the first

2 - 0In0NIn_ENIn: no hit in first 2 layer and expected in the second

3 - 0In0NIn: no hit in first 2 layer and not expected

4 - 0In1NIn_EIn: no hit in first layer and expected

5 - 0In1NIn: no hit in first layer and not expected
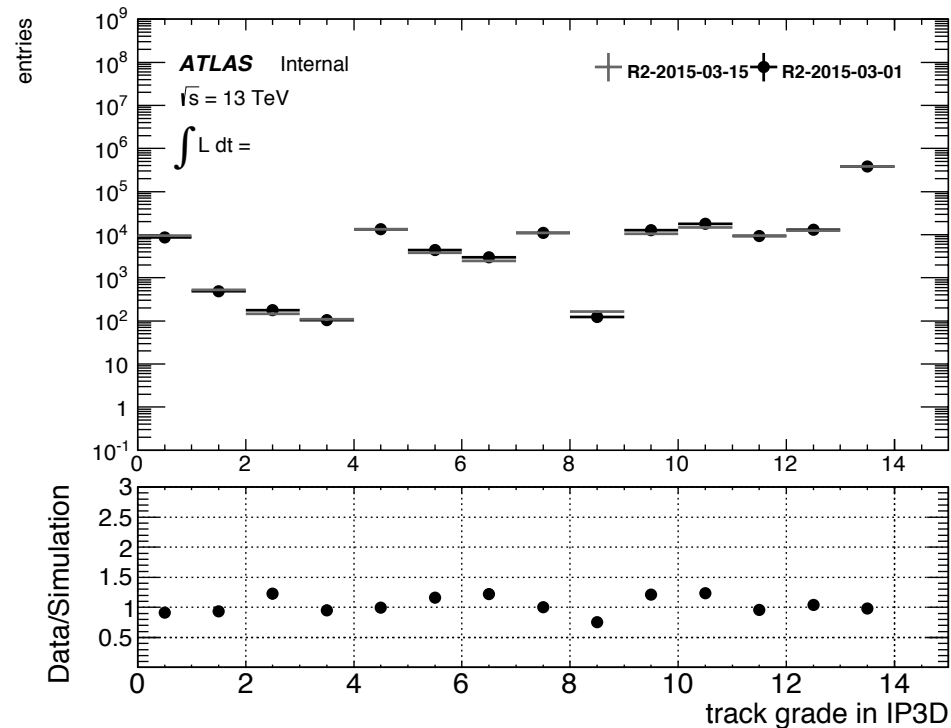
6 - 1In0NIn_ENIn: no hit in second layer and expected

7 - 1In0NIn_ENIn: no hit in second layer and expected

8 - First2LayerShared: shared in both first and second layer

9 - PixelShared: at least 1 share in first 2 layers or shared in other layers

10 -SCTShared: >1 shared in SCT (noPixShared)

11 -First2LayerSplit: at least a split hit in one of the first 2 layer

12 -PixelSplit: split hits in other pixel layers

13 -Good: split hits in other pixel layers

Data / Old MC
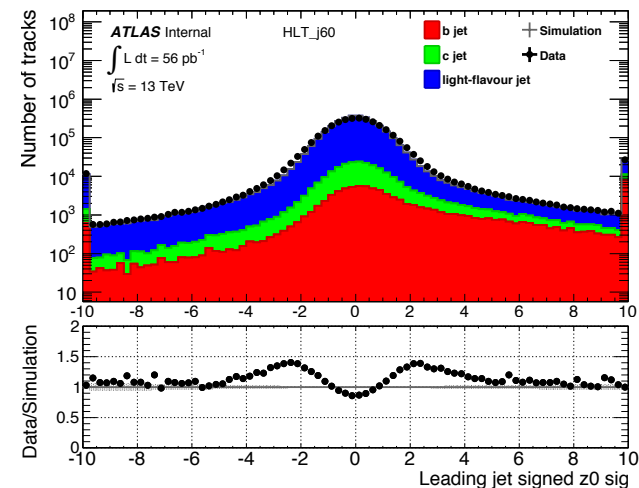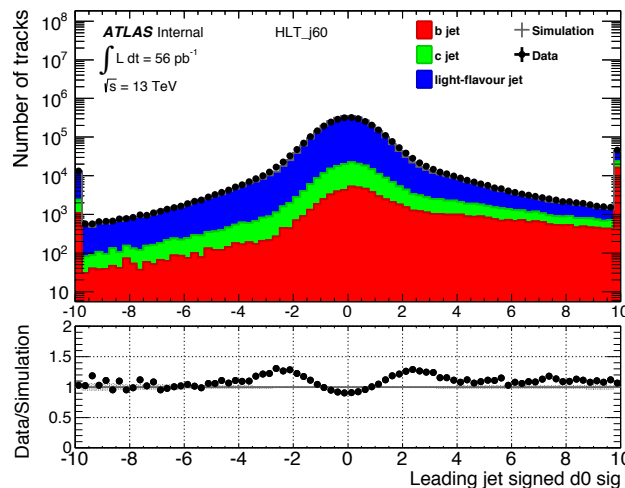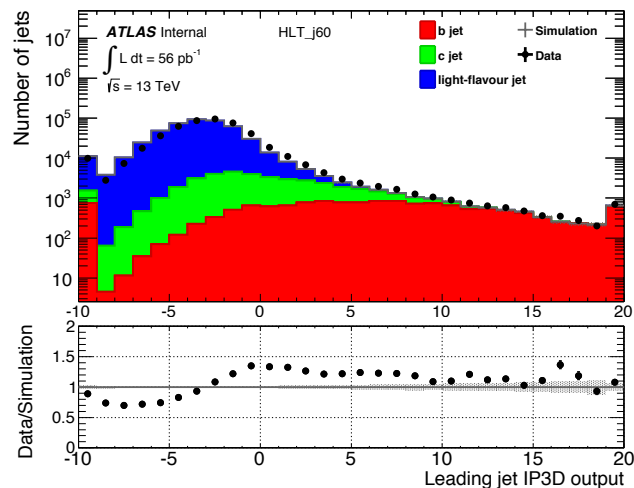
Old MC/ New MC
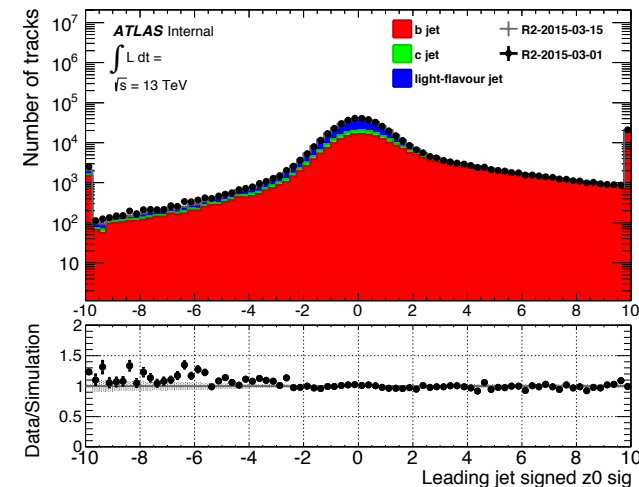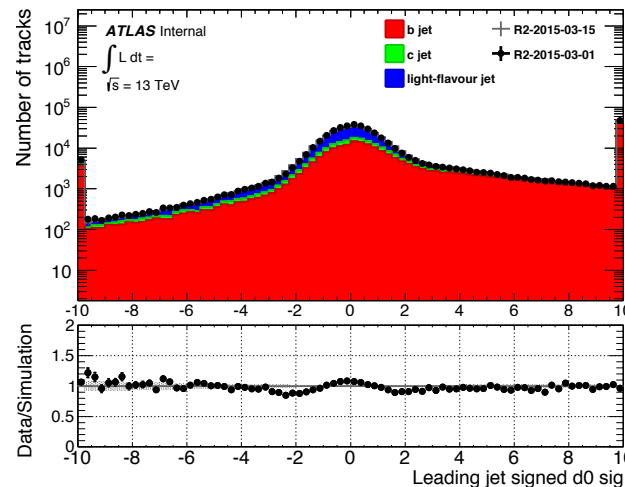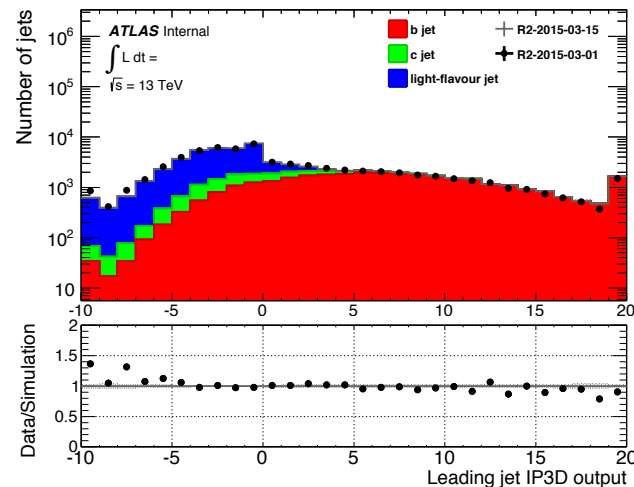
IP3D   d0 sig   z0 sig

- **Word of caution**: These are not like for like comparisons
- Above is light-rich dijet sample, below is b-jet rich ttbar sample

- **Updated Geo Sample**
  - Used MC ttbar events to look at a new updated geo sample.
  - Considered a validation sample for updated geo, ATLAS-R2-2015-03-**15**
  - Compared to ttbar sample with validated geo: ATLAS-R2-2015-03-**01**-00
  - No large or unexplainable discrepancies (Not always been true...)

- **Moving Forward**
  - We would like to request a dijet sample produced with updated Geo
  - This will allow us to re-compare to the data, to see if this explains the discrepancies between data and MC in the impact parameter distributions.

- **Request...**
  - *mc15_13TeV.36102X.Pythia8EvtGen_A14NNPDF23LO_jetjet_JZXW.merge.AOD*
  - Slices JZ1W-JZ4W, 1M per slice
  - Tag: *e3099_s2781_r7465_p2494*, for ATLAS-R2-2015-03-**15**
  - AFII should be enough
  - Need to use r20.7 and tags used in the JIRA ticket
  - How to compare r20.7 MC and r20.1 data?
    - Can we still compare IP distributions?
    - Reprocessing of data...