



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

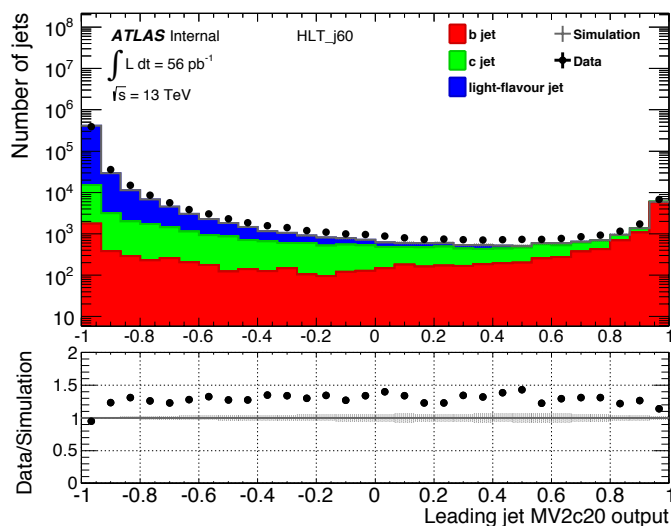
Laurie McClymont,
Flavour Tagging Group

Flav. Tag Algorithm Meeting
11/02/16

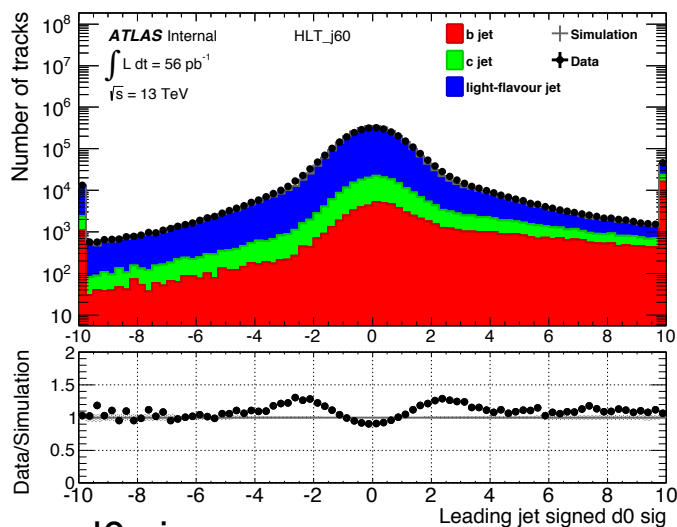
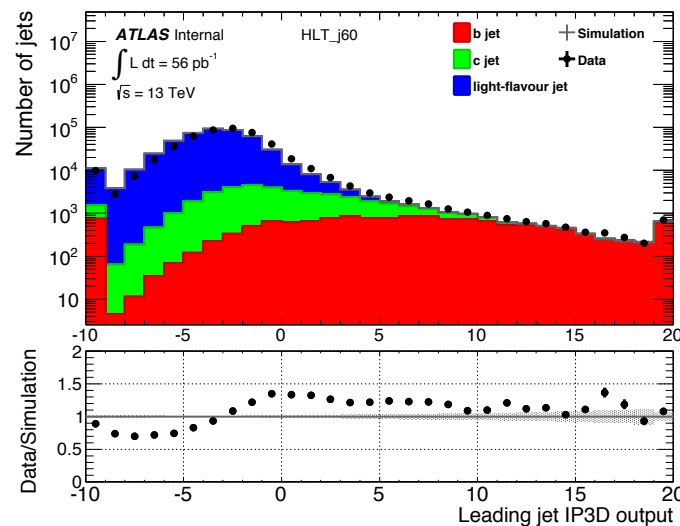


- Early Data/MC comparisons of key b-tagging variables in early Run-2 dijet events.
- There were some discrepant results ...

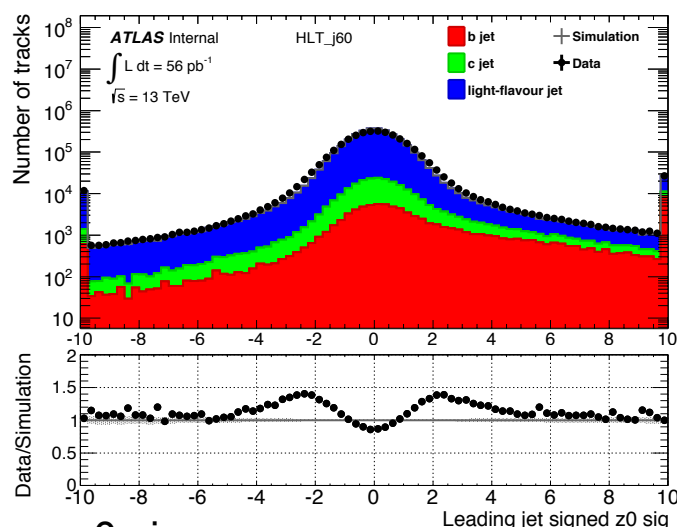
MV2c20



IP3D



d0 sig



z0 sig



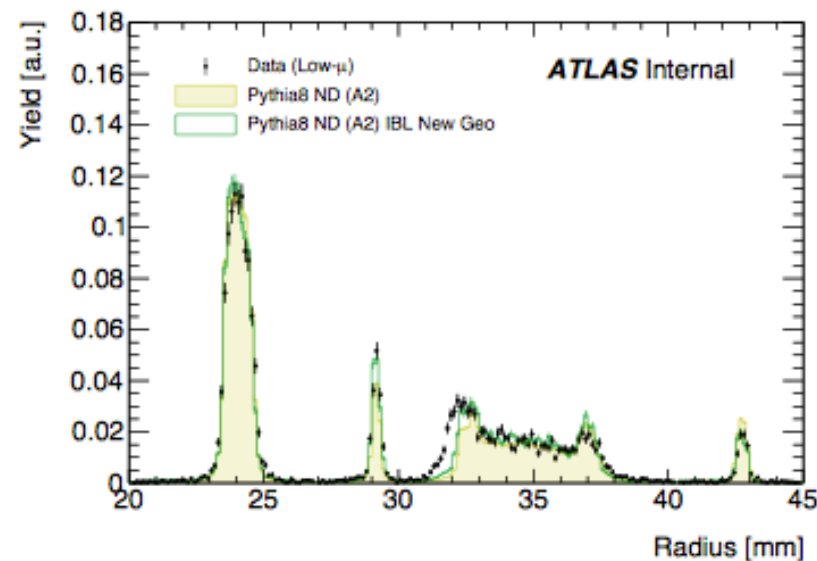
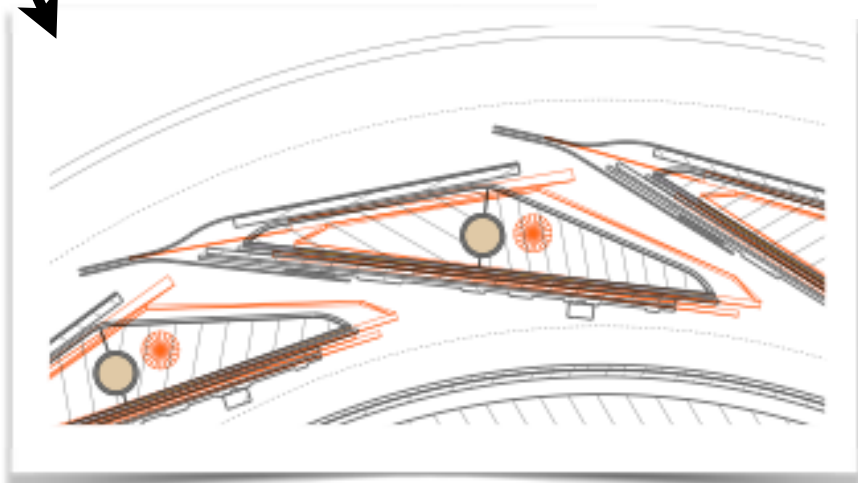
Problems

- 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

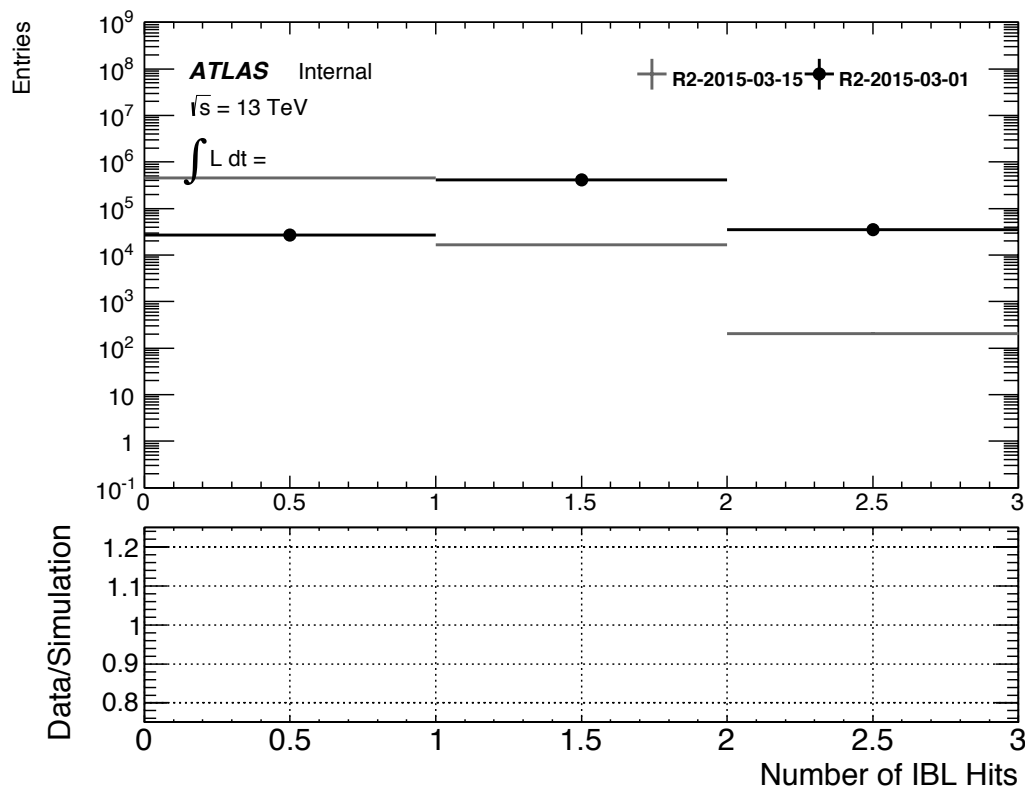
- pileupFinalBunch = 6

“valid1.110401.PowhegPythia_P2012_ttbar_nonallhad.recon.AOD.e3099_s2578_r7058_tid06432679_00”

- We are using NTuples created using Run2BTagOptimisationFramework

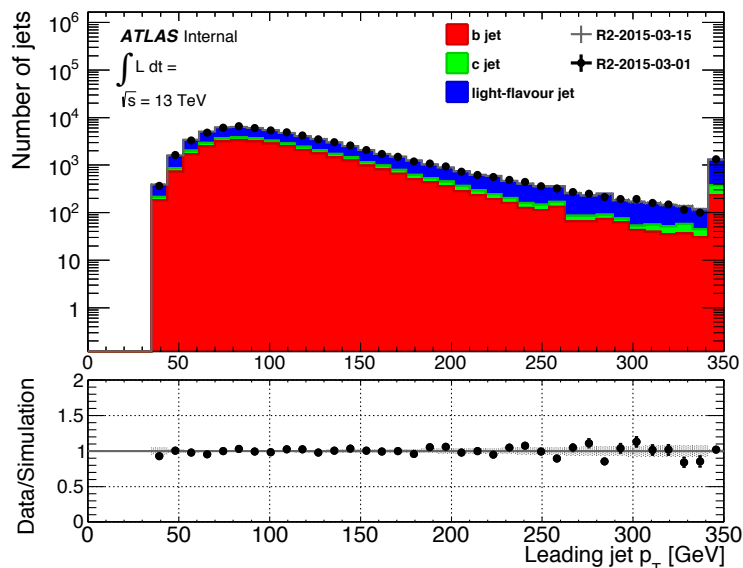


- **For a different production**
 - Problem with # IBL hits
 - Large number of 0 hit where hit is expected.
- **Don't panic! This is not the newest production**

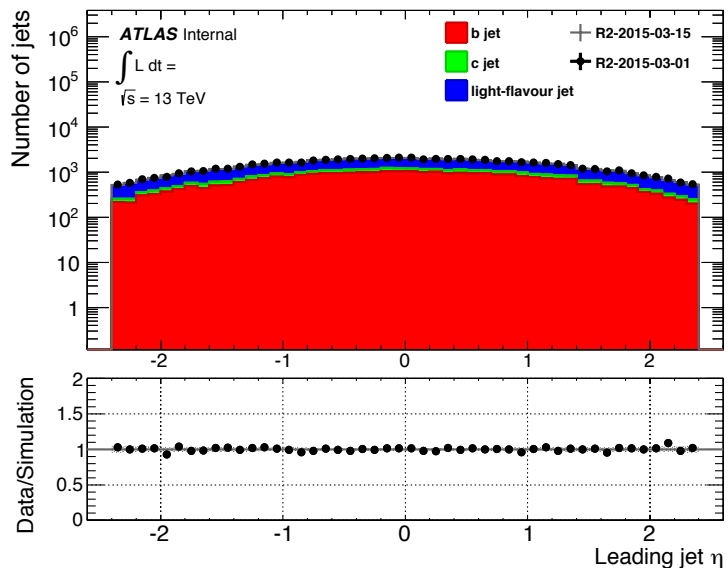
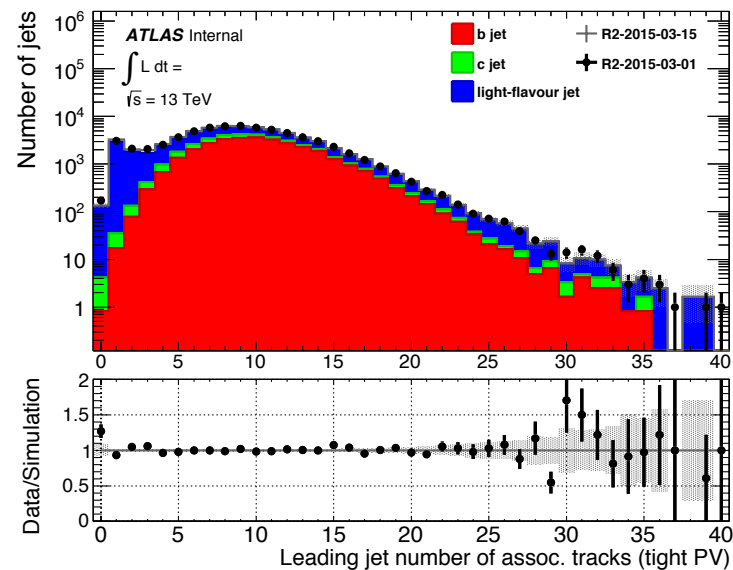




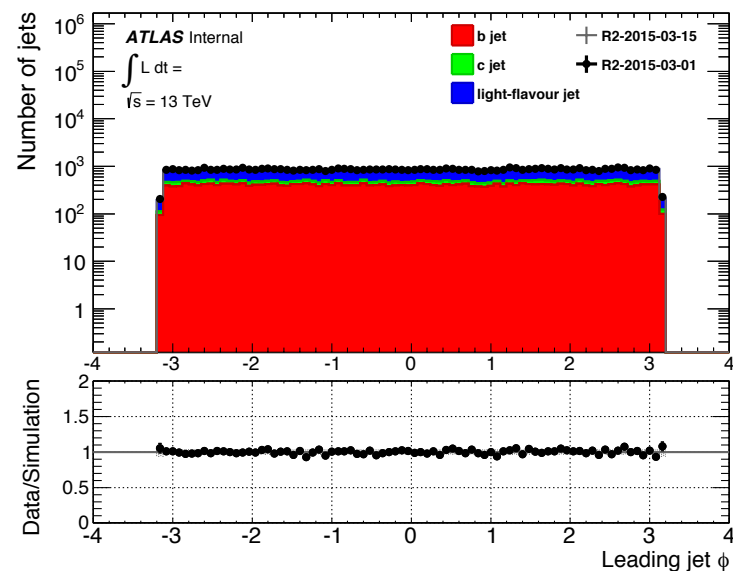
Jet p_T



Sum Track P_T



Eta

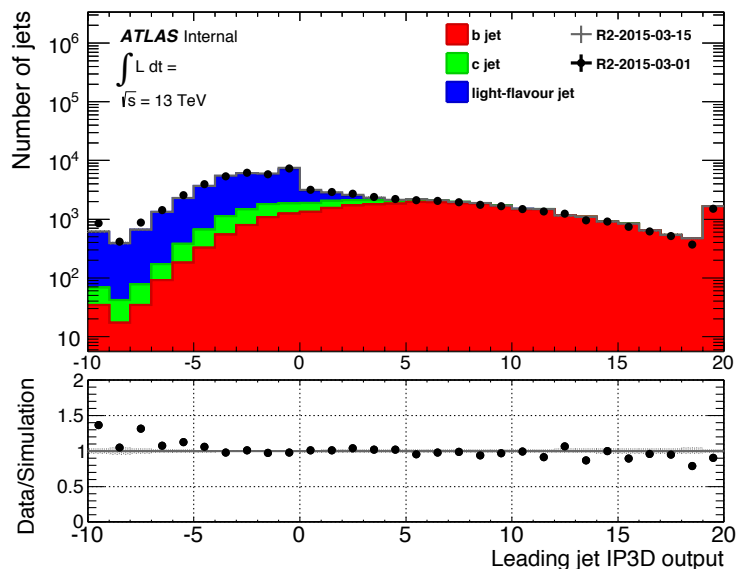


Phi

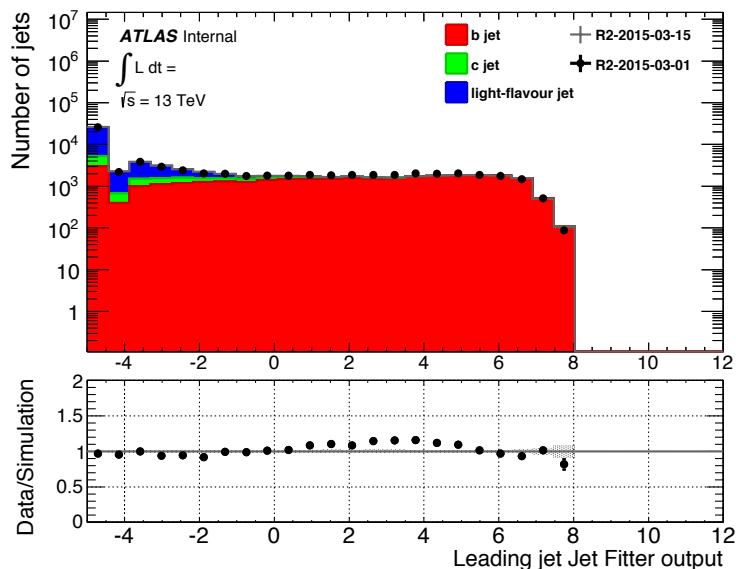
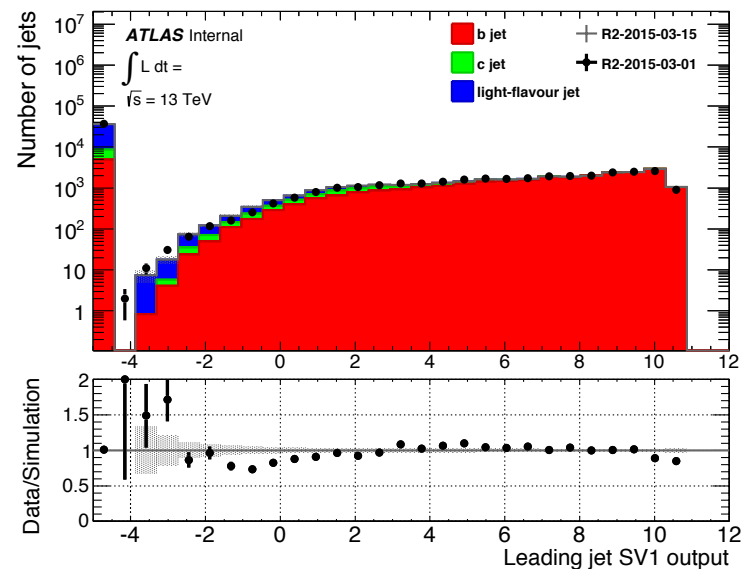


7 Tagger distributions

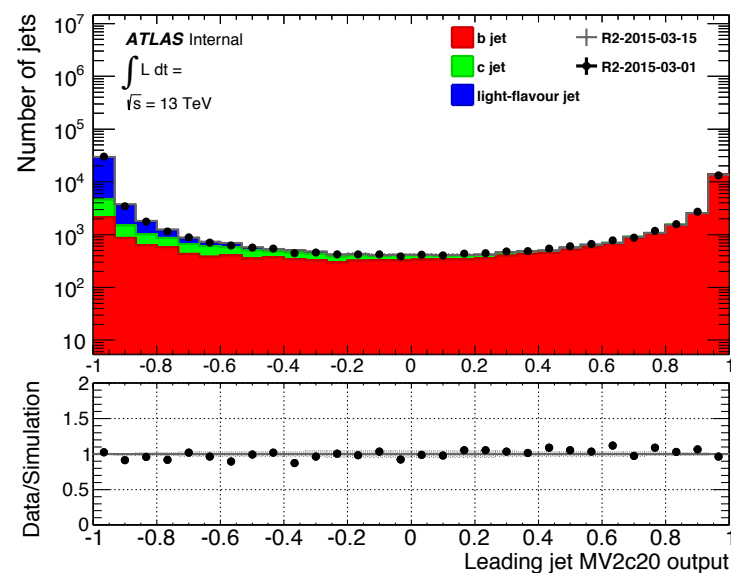
IP3D



SV1



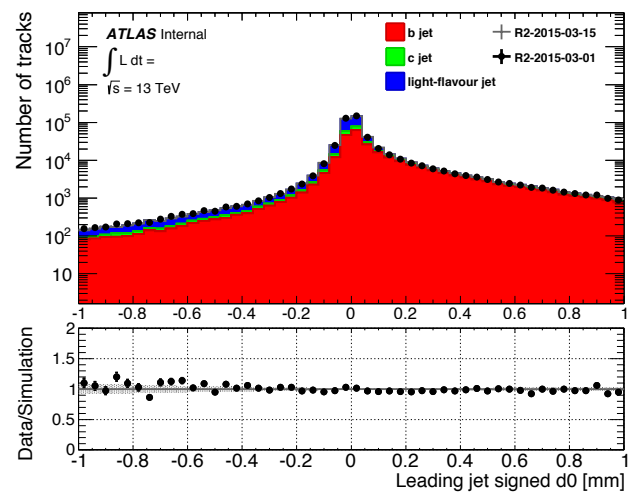
Jet fitter



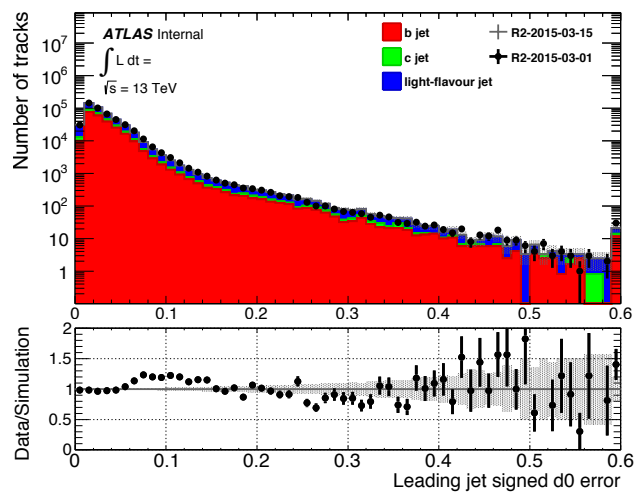
MV2c20



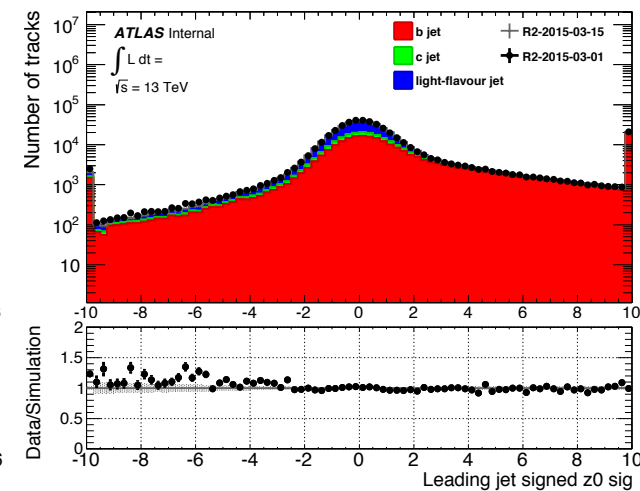
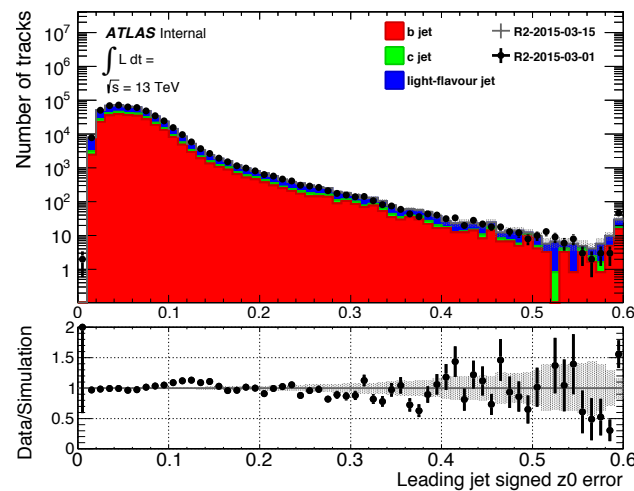
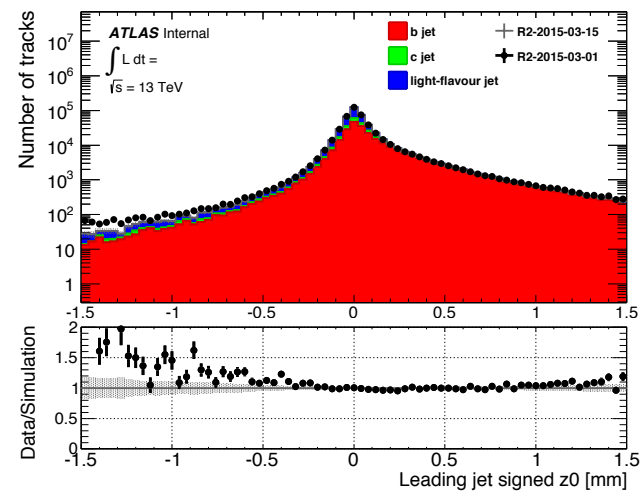
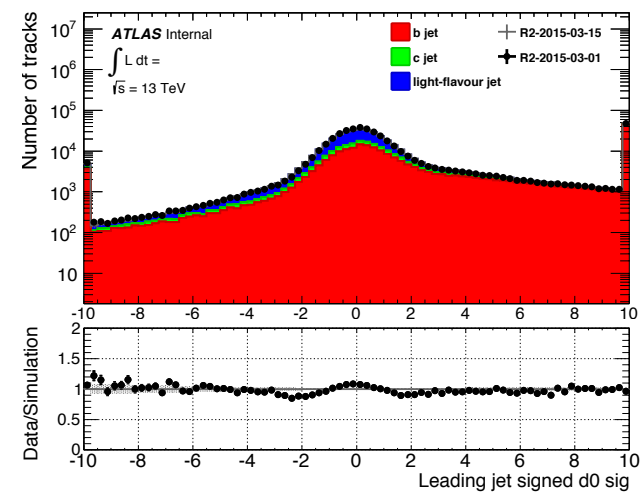
d0



d0 Err



d0 Sig



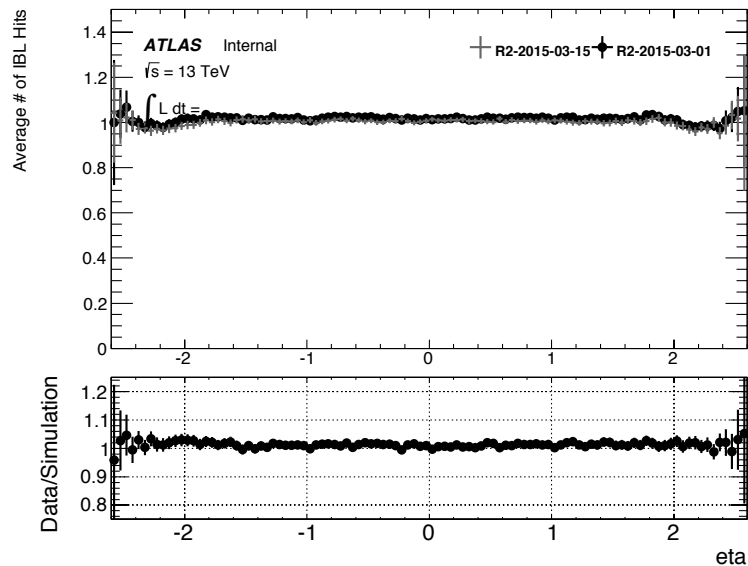
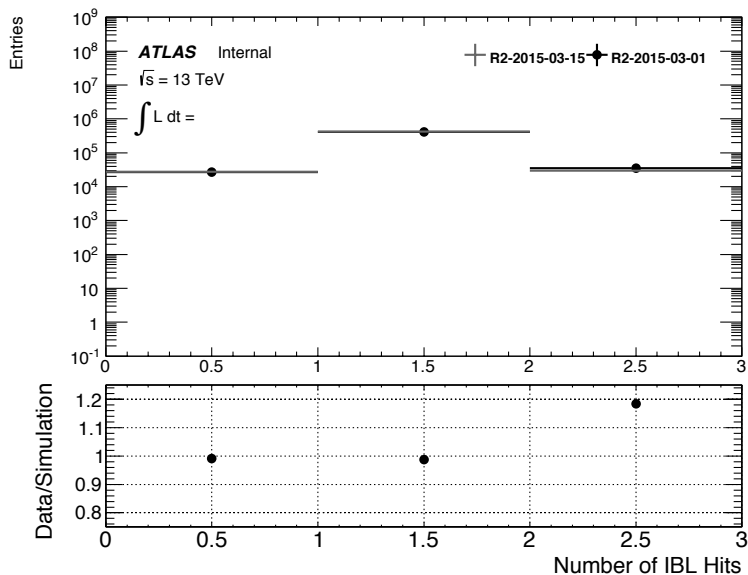
z0

z0 Err

z0 sig

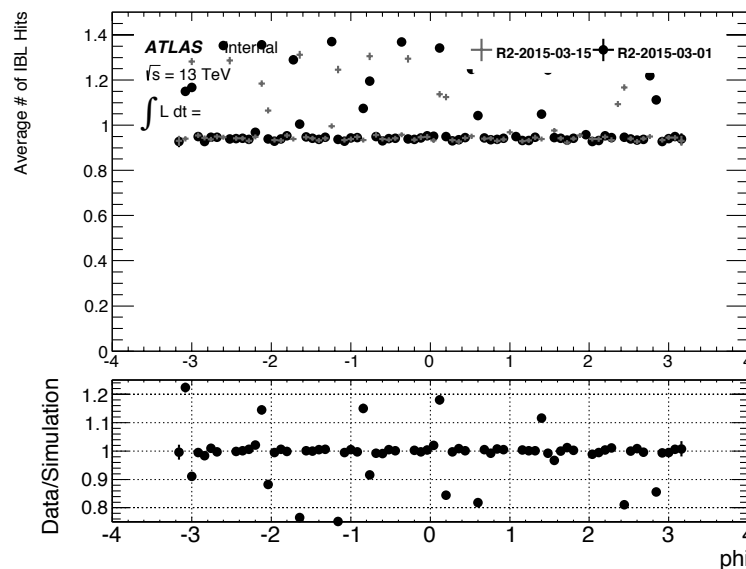
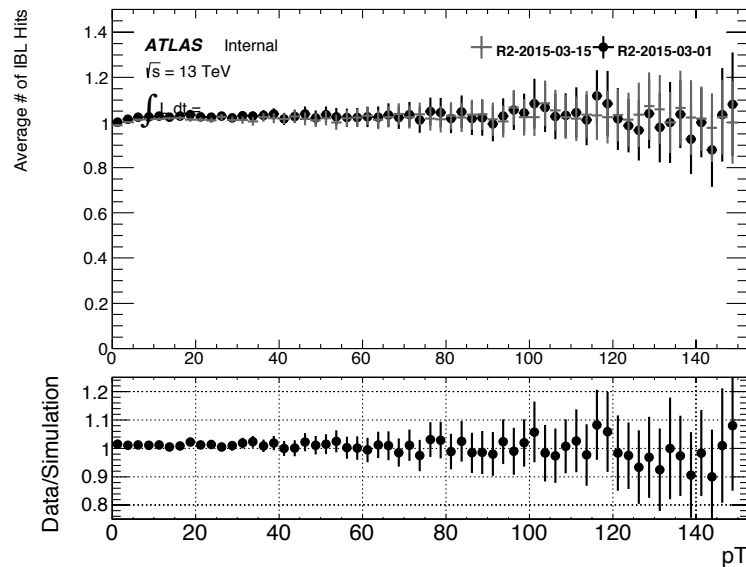


IBL Hits

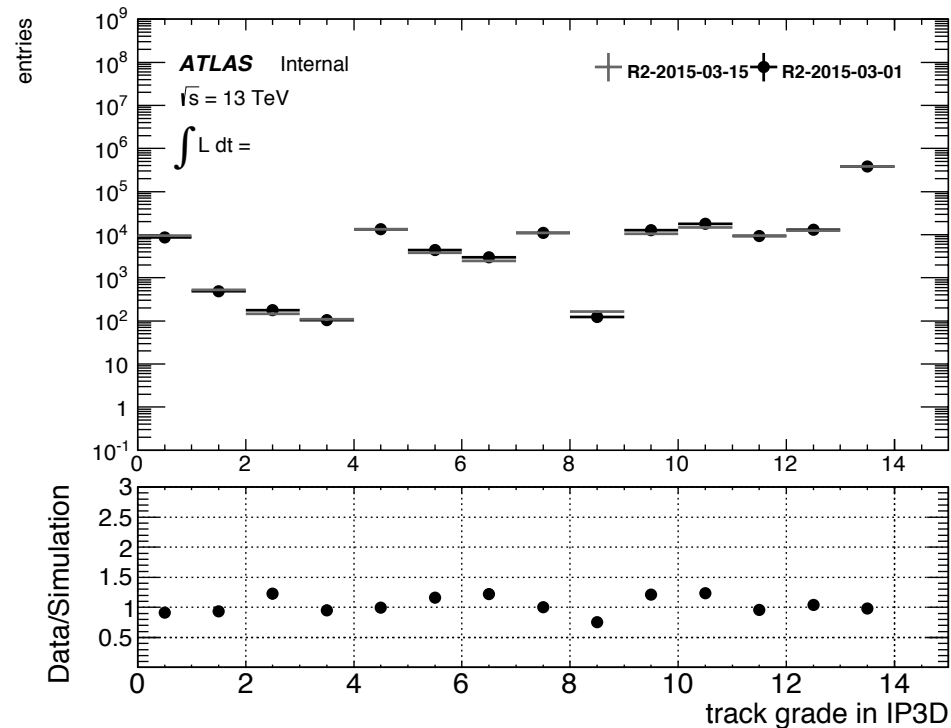


IBL Hits vs. η

IBL Hits vs. track p_T



IBL Hits vs. Φ

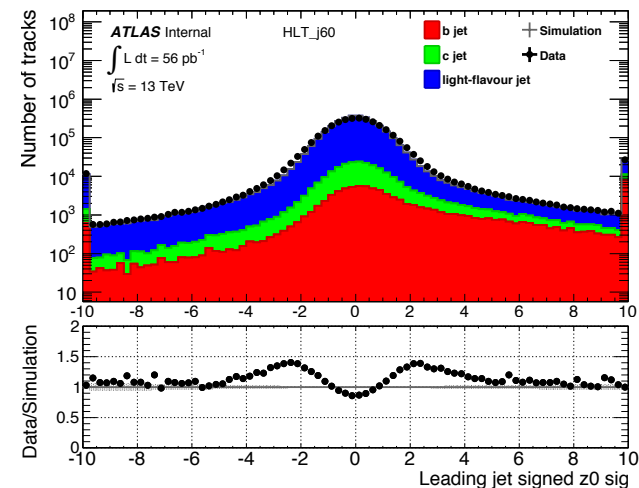
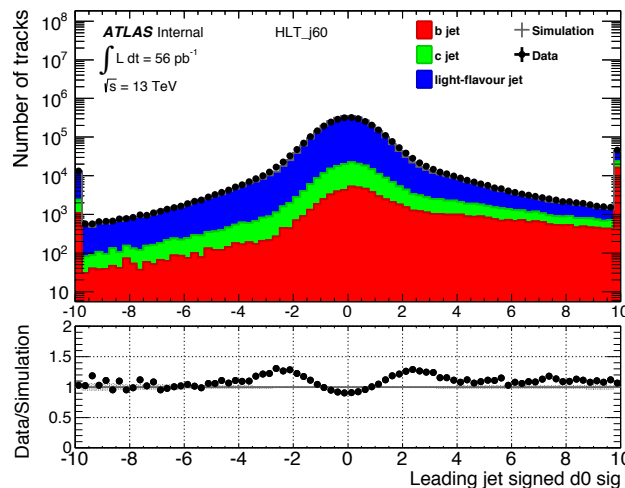
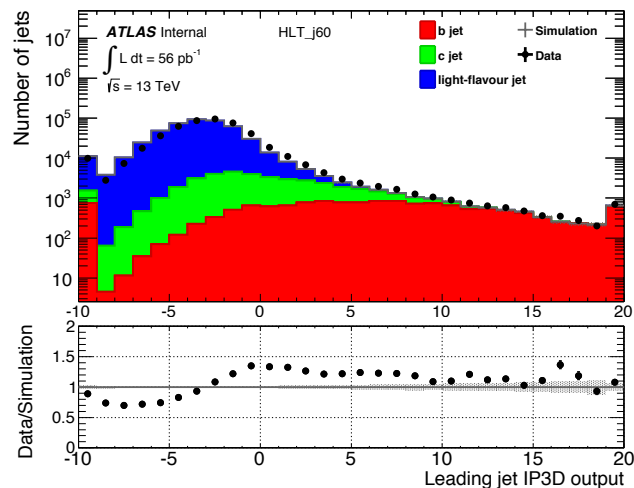


IP3D Grades:
Tracks split into 14 categories
- shown on right

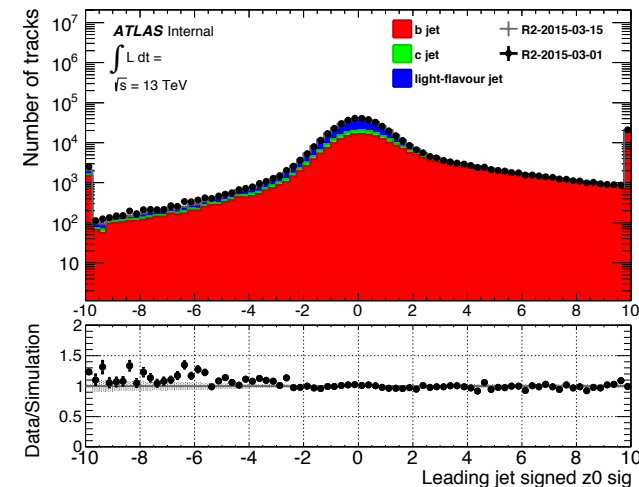
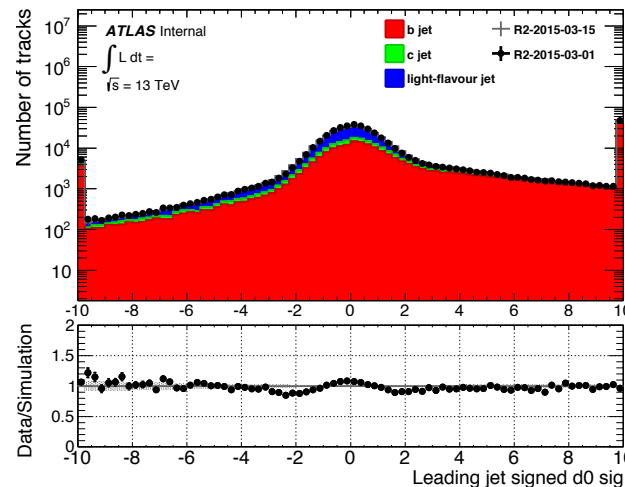
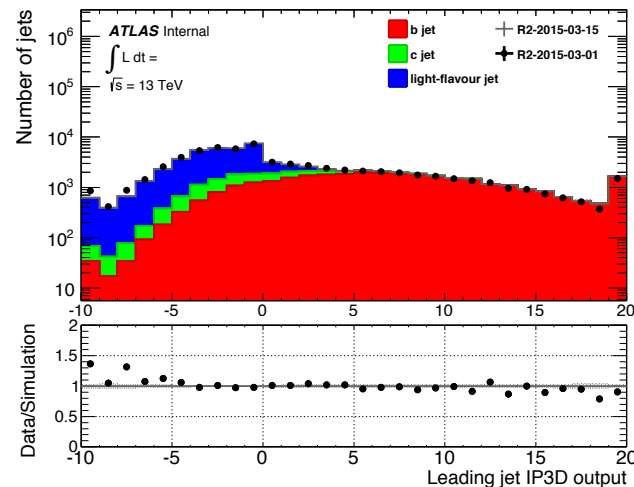
- 0 - 0In0In_EInENIn: no hit in first 2 layer and both expected
- 1 - 0In0In_EIn: no hit in first 2 layer and expected in the first
- 2 - 0In0In_ENIn: no hit in first 2 layer and expected in the second
- 3 - 0In0In: no hit in first 2 layer and not expected
- 4 - 0In1In_EIn: no hit in first layer and expected
- 5 - 0In1In: no hit in first layer and not expected
- 6 - 1In0In_ENIn: no hit in second layer and expected
- 7 - 1In0In_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...