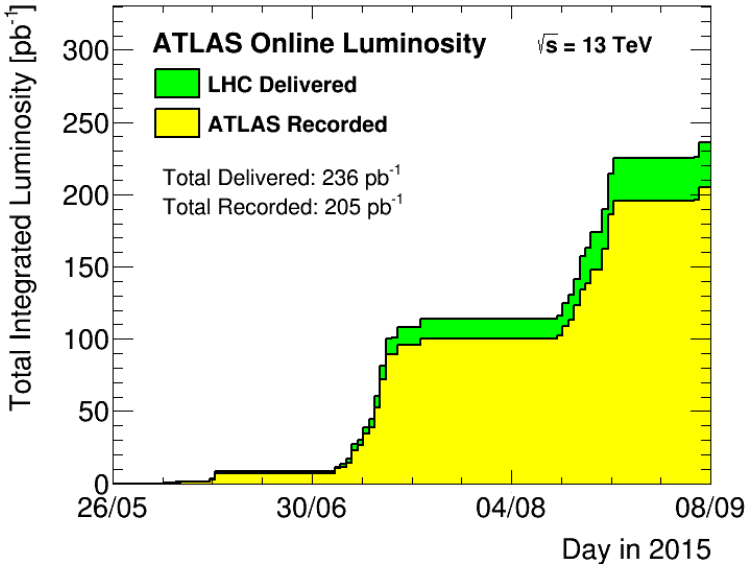
Weekly report IHEP



CDS entry
[wwyy]https://cds.cern.ch/record/1967498
[bbττ]https://cds.cern.ch/record/1967500
[combination]https://cds.cern.ch/record/1984111/
[paper draft]https://cds.cern.ch/record/2008753/

ATLAS weekly
https://indico.cern.ch/event/434823/
Open presentation
https://indico.cern.ch/event/436601/
Public reading
https://indico.cern.ch/event/440611/

Xiaohu SUN

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08-09-2015
IHEP

STATUS – HH combination

- CDS entry
  - [wwyy]https://cds.cern.ch/record/1967498
  - [bbττ]https://cds.cern.ch/record/1967500
  - [combination]https://cds.cern.ch/record/1984111/
  - [paper draft]https://cds.cern.ch/record/2008753/
- ATLAS weekly https://indico.cern.ch/event/434823/
- OP https://indico.cern.ch/event/436601/
- ***PR*** https://indico.cern.ch/event/440611/ *(extraordinarily* smooth …); caught up LHCP deadline for plots
- Some minor issues found by careful readers last week
  - inconsistent curves in subchannel and comb limit plots; this is due to historical changes on one of the plots (less mass points were shown in bbtautau alone but all mass points were shown in comb case); consistent now

STATUS – RUN II wwyy

- Object definitions (keep consistent with other channels)
  - gamma:
    - exactly same def as used in HGam and bbyy
    - ID tight; ISO Cone20 (topoetcone20 < 0.015 pT + 1.5; ptcone20/pT < 0.04)
    - pT> 25 GeV; |η| < 2.37 removing crack (1.37<|η| <1.52)
  - electron
    - ID LHtight; ISO tight
    - pT > 10 GeV (***7 GeV*** is the minimum of valid kinematic acceptance)
    - |η| < 2.47 removing crack (1.37<|η| <1.52)
  - muon
    - ID medium; ISO tight
    - pT > 10 GeV (Reco SFs are valid in the full pT range, with extrapolated values and larger uncertainties below ***10 GeV,*** while iso SFs are only valid in [10,120] GeV)
    - |η| < 2.5

STATUS – RUN II wwyy

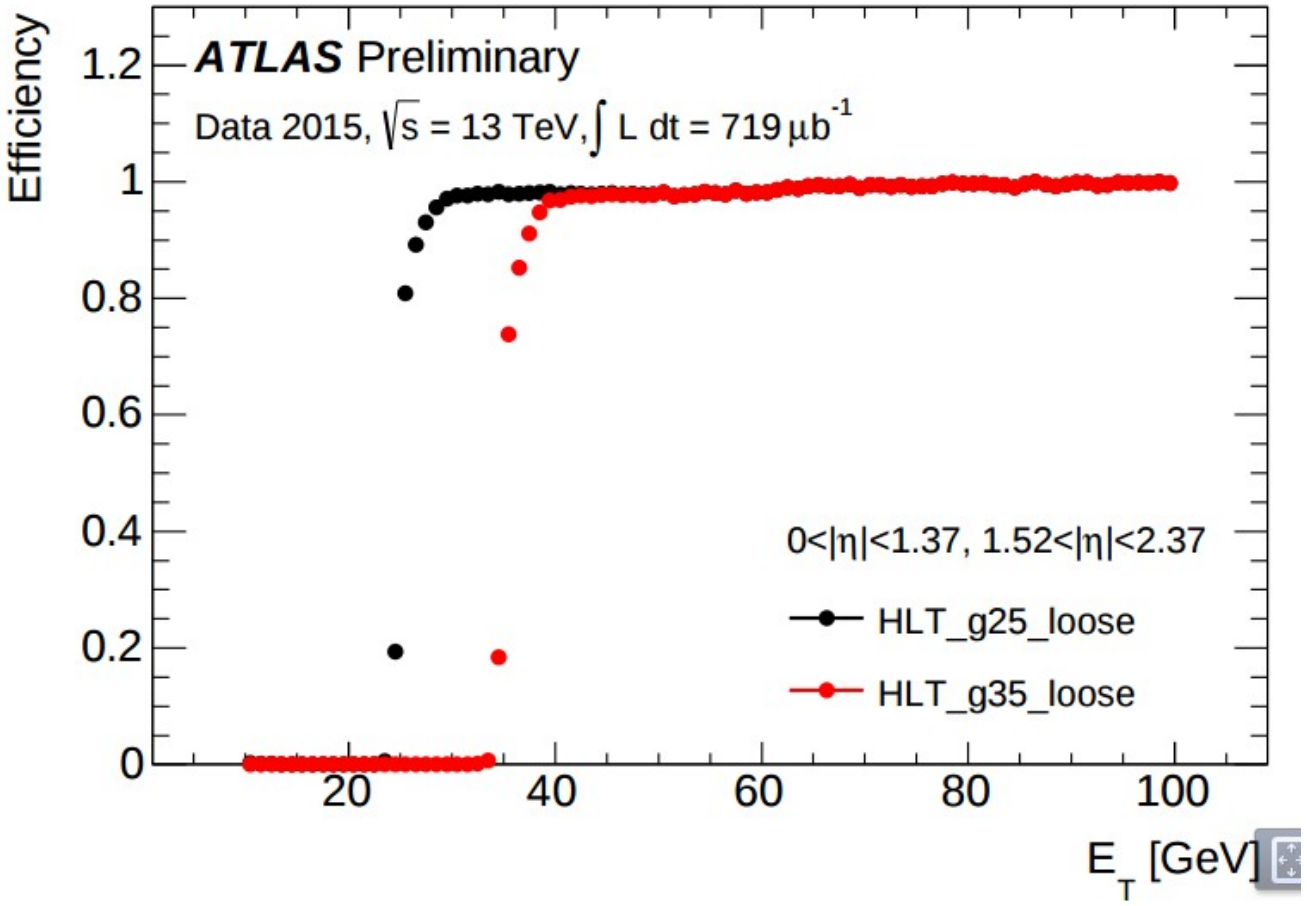
- Object definition (cont.)
  - jet
    - AntiKt4EMTopoJets
    - pT> 25 GeV, |η| < 4.4, JVT
  - MET
    - rebuilt instead of being used “out of the box”
    - MET_Reference_AntiKt4EMTopo
    - Qi is working on this

STATUS – RUN II wwyy

- Potential interesting control region
  - lvjj+yy (>=2 jets + >=1 leptons)
    - fake rate estimation from: >=2 jets + no lepton requirement
    - fate rate validation from: no jet requirement + >=1 leptons
  - jjjj+yy (>=4 jets)
    - background modeling from: >=3 jets OR from MC
    - fake rate validation from: ==2 and ==3 jets
- In order to keep "signal region" ***orthogonal*** to other channels
  - **bbyy**: veto events with >=3 bjets
  - **bbbb**: signal events with >= 4 bjets; ==3 jets as control region
  - **bbtautau** … not yet
  - **wwyy**: *we probably need to veto events with any* ***bjets*** …
  - **bbww**: boosted regime, from Biagio
  - **yytautau**: (***NEW***) from Stan and his student

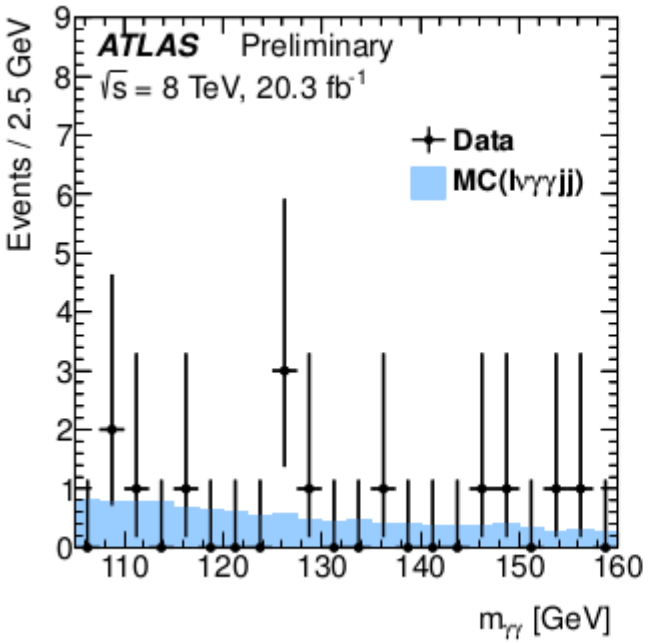
STATUS – RUN II wwyy

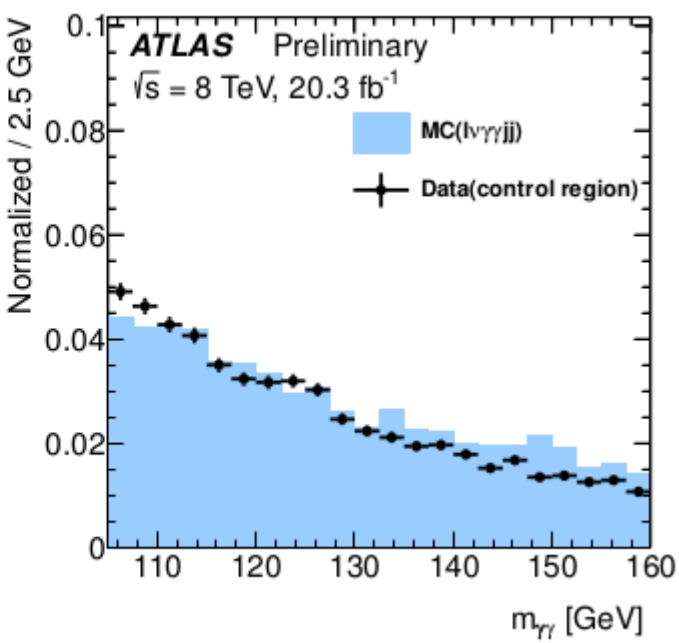
- Trigger consistent with HGam bbyy
  - OR of g35_loose_g25_loose, g35_medium_g25_medium, 2g20_tight



STATUS – RUN II wwyy

- bkg samples for lvjjyy: we follow what has been done in RUN I
  - MG5-generated events for lvyyjj
  - ***lower*** threshold is down to 50 GeV from 85 GeV recommended by Huijun
  - ***high*** threshold? if any
  - when generating multi-leg, **merging/matching** procedure to remove overlaps, properly done in RUN I?





STATUS – RUN II wwyy

- MC bkg samples for jjjjyy
  - try with MG5; don't know if it is feasible to generate events with so many jets ... in MG5; need to verify
  - try with multileg generators, since we have only yy + couple of jets; such as Alpgen, Sherpa (shower embedded)