A glimpse of

HGamma_meeting(9th June)

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15th June

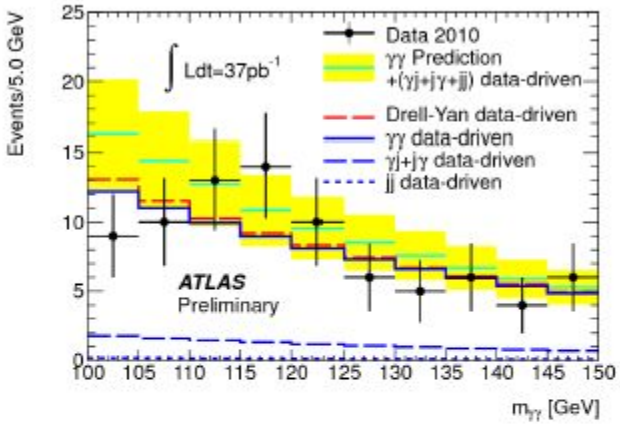
Outline

- Introduction *(Elisabeth Petit (DESY), Dag Gillberg (CERN))*
- xAOD summary *(Tony Thompson, University of Pennsylvania)*
- EFT Analysis Status *(Florian Urs Bernlochner, Universitaet Bonn (DE))*
- HGam Cross-Sections *(Christopher John Meyer (University of Pennsylvania (US)), Florian Urs Bernlochner (Universitaet Bonn (DE)))*

Introduction

Data, data, data!

- ~1.1 pb^{-1} of recorded data ($\sigma.BR_{H\to\gamma\gamma} = 0.1$ pb)
  - the derivations appear ~4 days later
  - more info on those runs: SpecialRunsIn2015

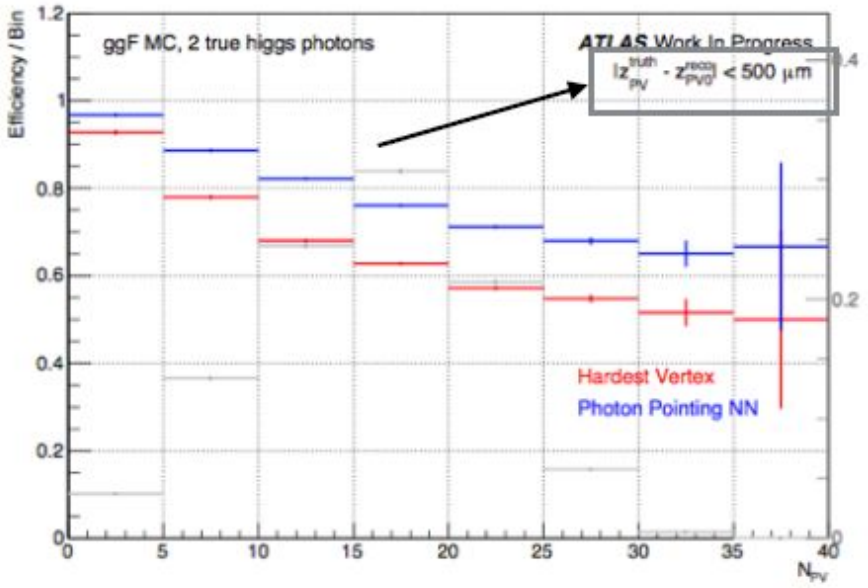


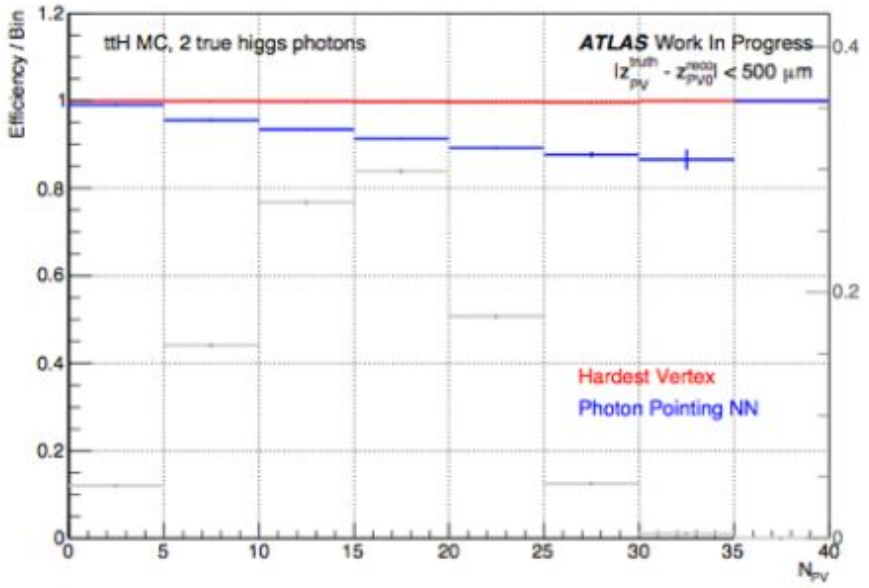
- How do I find my data?
  - COMA report
  - run-query : find run periodA and lhc stablebeams true
  - AMI : data15_13TeV.%.physics_Main.%DAOD_HIGG1D%p2361%

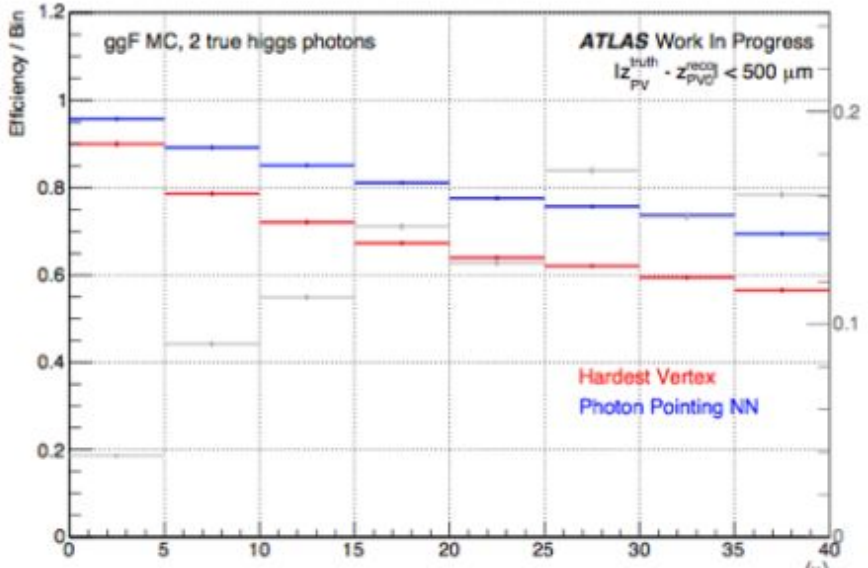
- Please look at them!
  - already useful feedback from the very first collisions two weeks ago
  - several groups interested in background decomposition

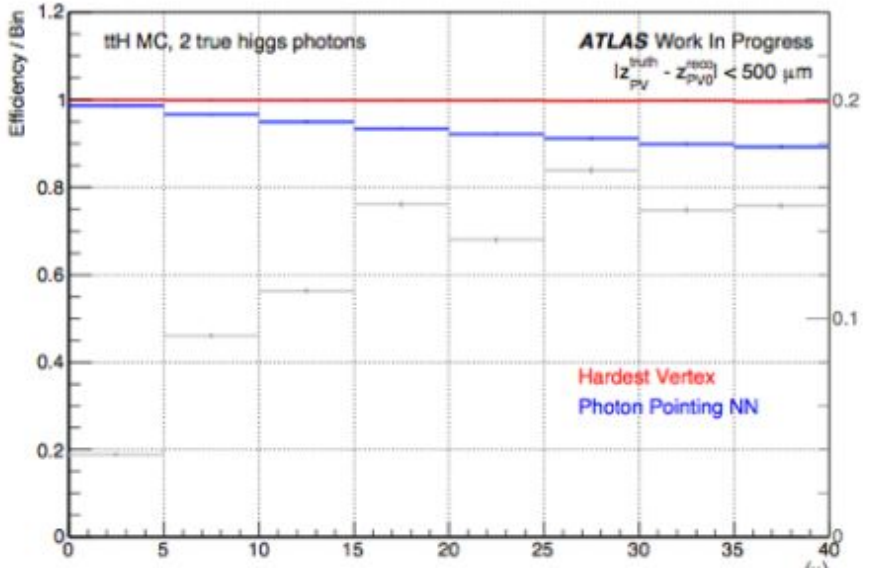
xAOD summary: Vertex selection tool

Vertex Selection Efficiency Dependence on N_{PV} and $\langle\mu\rangle$



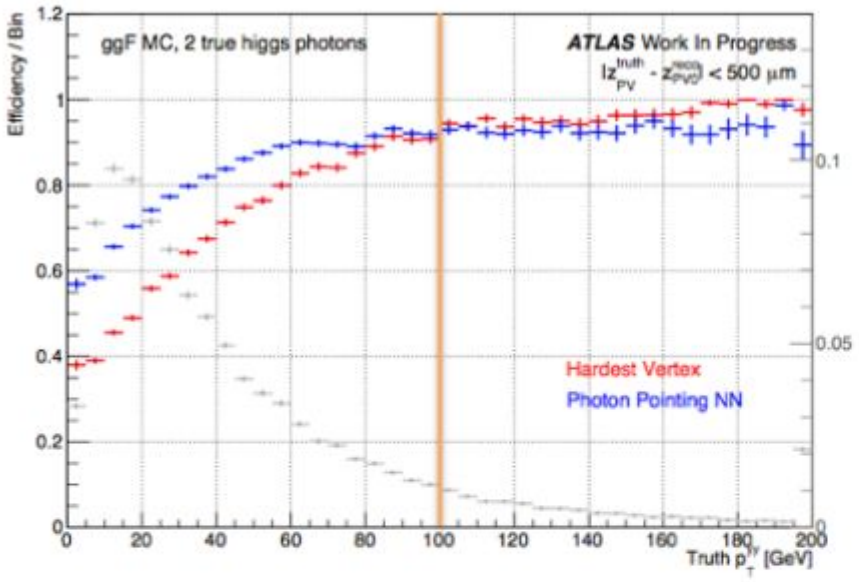


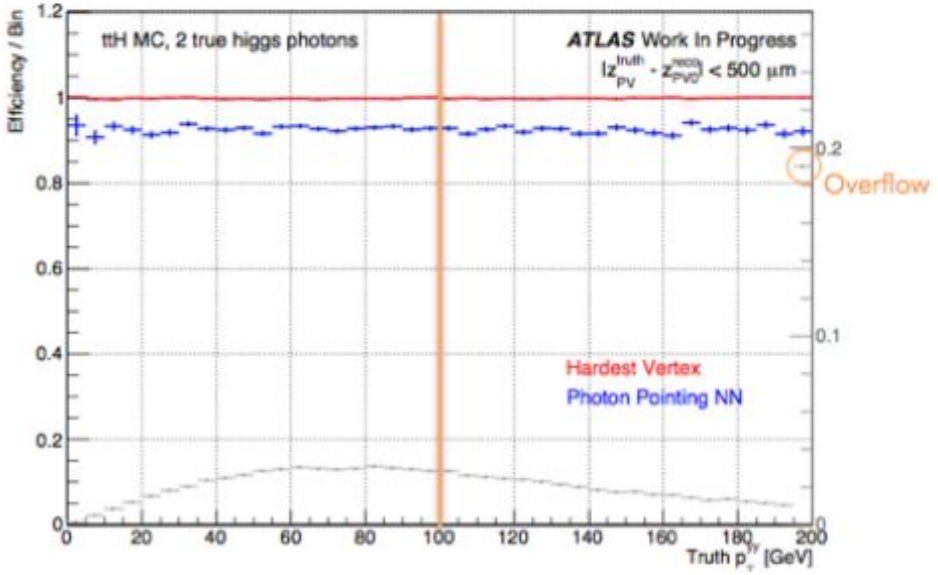




xAOD summary

Hybrid Vertex Selection based on Higgs P_T





Creating a "hybrid" vertex selection shows improvement in vertex selection efficiency of

+3.9% for ttH
+0.3% for ggF
Using Photon P_T

+4.2% for ttH
+0.4% for ggF
Using Higgs P_T

EFT analysis status

Total Higgs width

- All cross section predictions do not incorporate any changes on the total Higgs width.
  - This is a very good approximation for the operators that couple to photons.
  - Leads to a 10% correction on the total width for gluons

Fix: $$\sigma \rightarrow \sigma \times \frac{\Gamma_{\mathrm{SM}}}{\Gamma_{c_i}}$$

- No state-of-the-art generator has this implemented at this point (what included MG5); ehdecay can only make predictions for linear corrections (what excludes the CP odd contributions)

HGamma cross-section

- Extract cross-sections for different fiducial regions
  - Chosen to highlight different production mechanisms (VBF, etc.)
- Uses bin-by-bin unfolding to particle level
  - Photon particle-level isolation important for model independence
- Uncertainties dominated by sample size
  - Will be the same for first 13 TeV measurements