

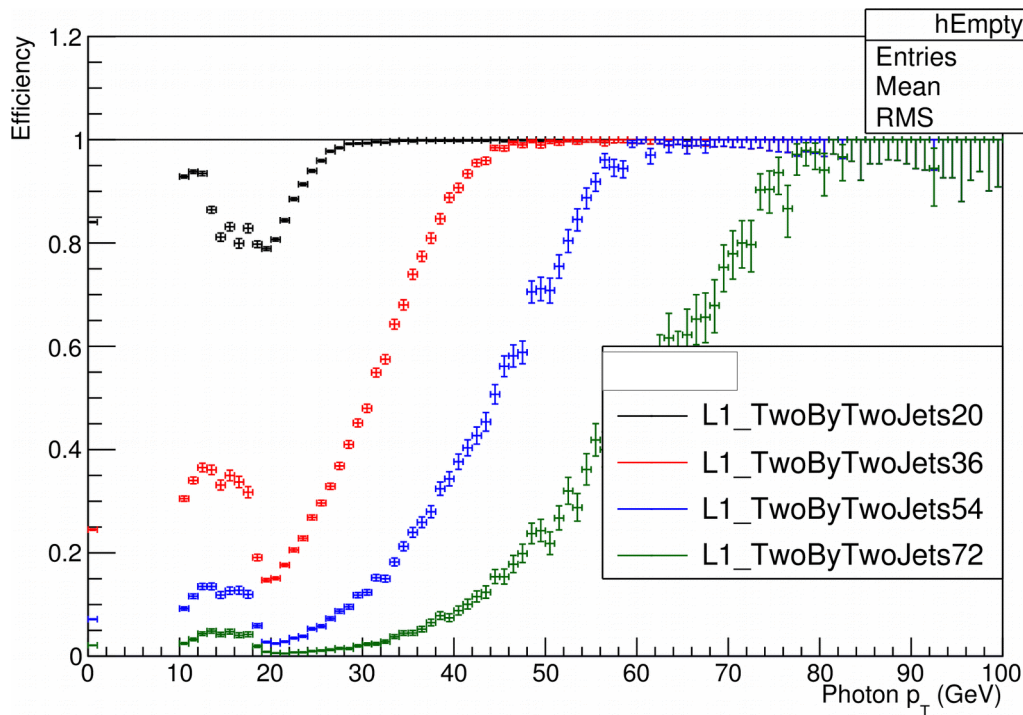
L1 Photon Status

- L1 EM candidates inefficient
- Looking at alternative seeding objects:
 - regions (see backup or Monday's slides)
 - 2x2 jets
 - 3x3 jets
- Photon statistics low in MB sample, producing embedded photon30 sample (currently 2 jobs left of GEN-SIM step)
- (Also producing embedded Dijet30 sample, currently in DIGI2RAW step)

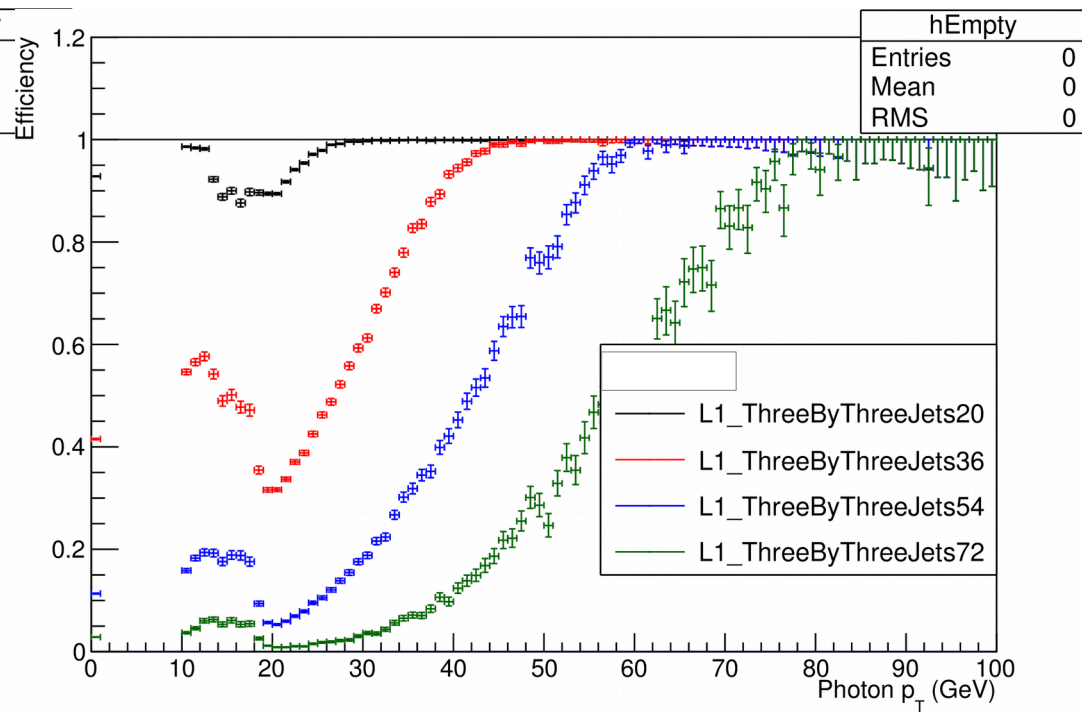
Offline selection

- $\text{if}(\text{TMath}::\text{Abs}(\text{photon_eta}[i]) < 1.4791)$
- spike cuts:
 - $\text{if}(\text{TMath}::\text{Abs}(\text{seedTime}[i]) < 3)$
 - $\text{if}(\text{swissCrx}[i] < 0.9)$
 - $\text{if}(\text{sigmaletaeta}[i] > 0.002)$
 - $\text{if}(\text{sigmalphi}[i] > 0.002)$
- No isolation or H/E cut on offline photons
- photon20-triggered data

2x2 and 3x3 jet seeding of photons



2x2 jets, no L1 eta cut



3x3 jets, no L1 eta cut

Photon20_30 triggered 2011 data

From Bi Ran

Active TODOs @Boston

- Add L1 eta cut to jet seeds (will reduce rate, probably not reduce efficiency)
- will produce 2x2 & 3x3 rates on 5.02TeV sample
- As for jet study, compare turn-ons at same rate and same point of 100% efficiency in 5.02 sample

Backup



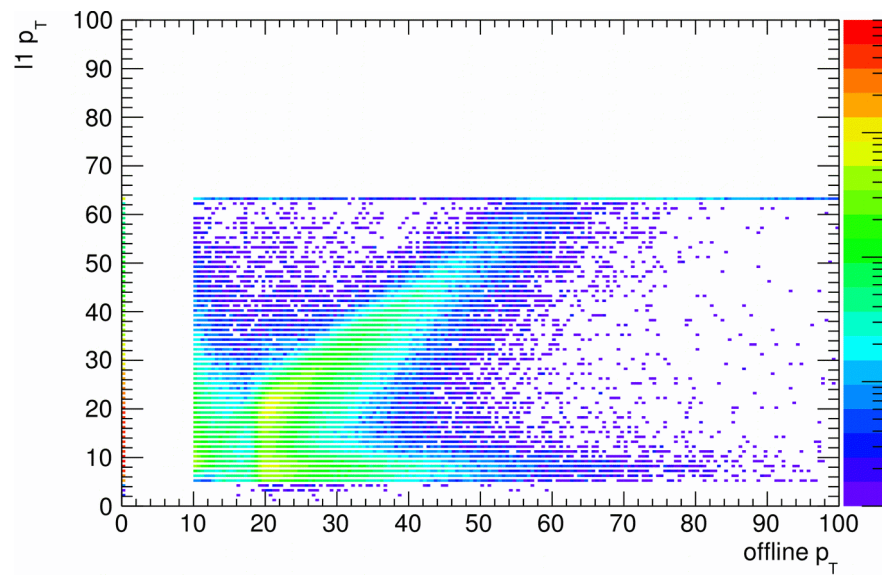
L1 EGamma Alternative Seeding

- Reminder: see large inefficiency using the “L1 EGcands” as seeds for photons. Looking at alternative seeds with acceptable rate.
- Today:
 - Maximum background-subtracted region within eta of 1.74 (similar (identical?) to single track seed trigger)
- Soon:
 - 2x2 and 3x3 jets with $|\eta| < 1.74$
- Some information collected at this Google Doc:
 - https://docs.google.com/spreadsheets/d/1I_T7Zs-IBCyR4UMiN5KEQ648sviSQMPWDywmtjefBKKQ/edit?usp=sharing

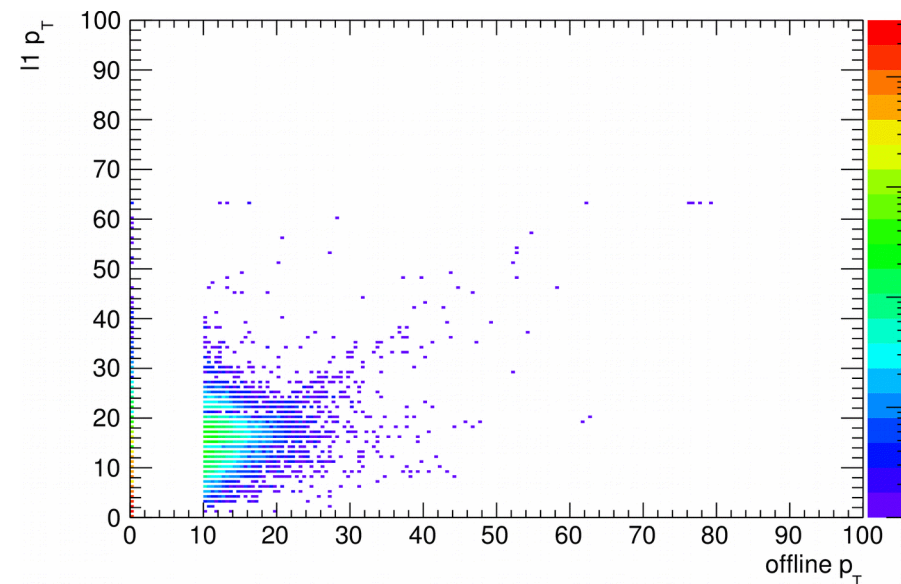
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- No isolation or H/E cut on offline photons
- Using 2011 MB data and photon20-triggered data, 5.02 TeV MB Hydjet

L1-Offline correlation (emcands)



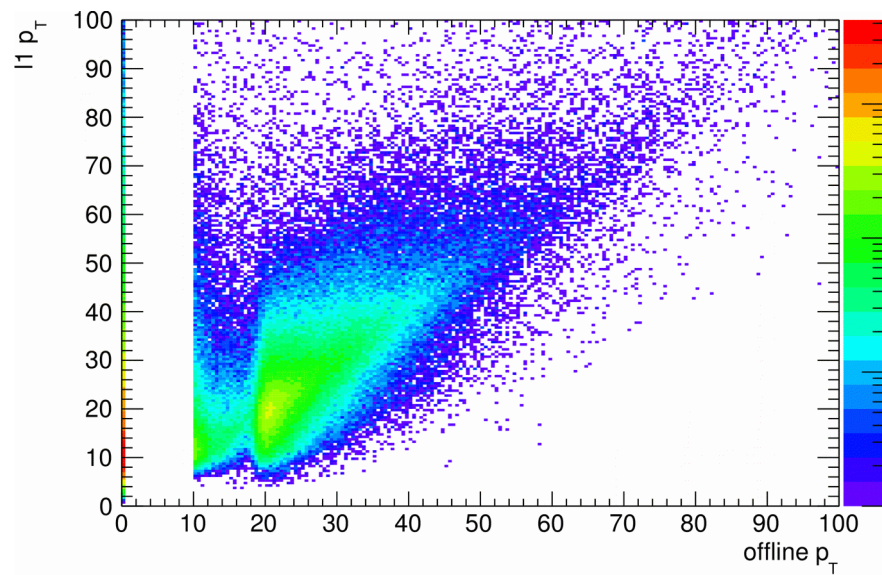
2011 Photon-triggered Data



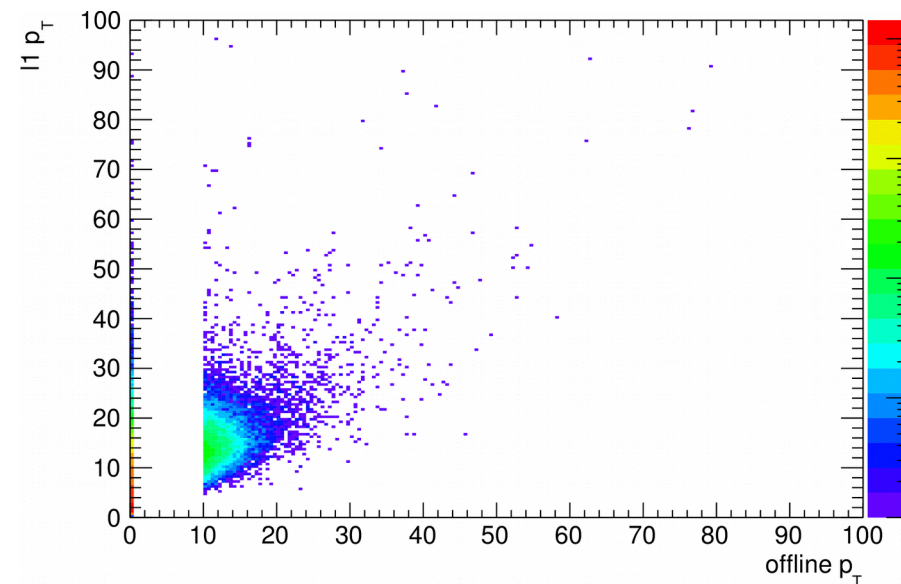
5.02 TeV Hydjet

- Low photon statistics make it hard to tell what is going on in MB samples
- Striation is an artifact of L1 granularity

L1-Offline correlation (regions)



2011 Photon-triggered Data

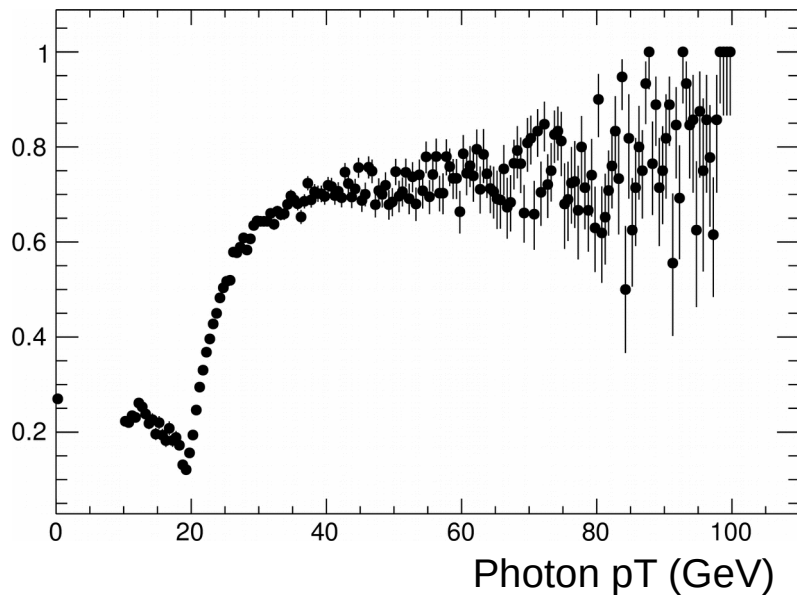


5.02 TeV Hydjet

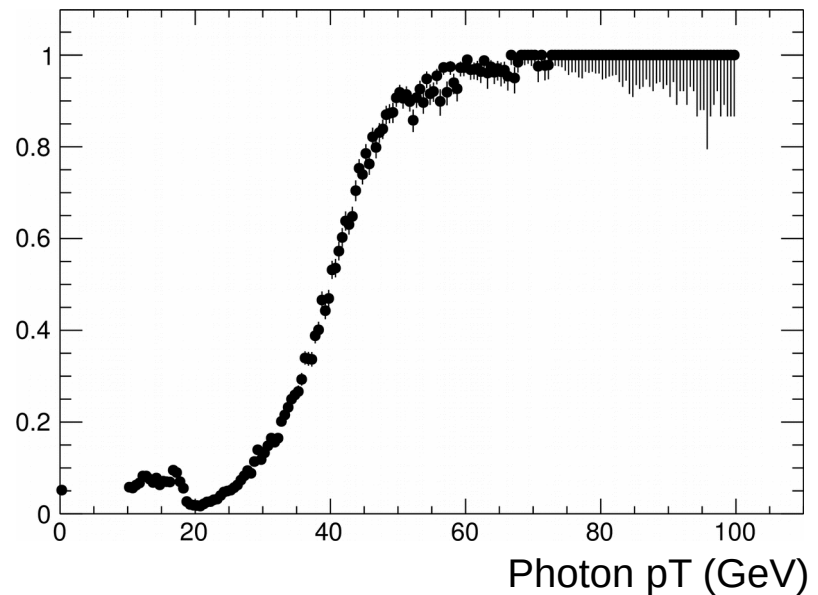
- Low photon statistics make it hard to tell what is going on in MB samples
- Correlation significantly improved in photon-triggered sample

Turn-On Curves

- Using the 5.02 Hydjet sample at 30kHz:
 - egcand: 493Hz at threshold of 20 GeV
 - regions: 569Hz at threshold of 20.5 GeV (surprisingly similar!)



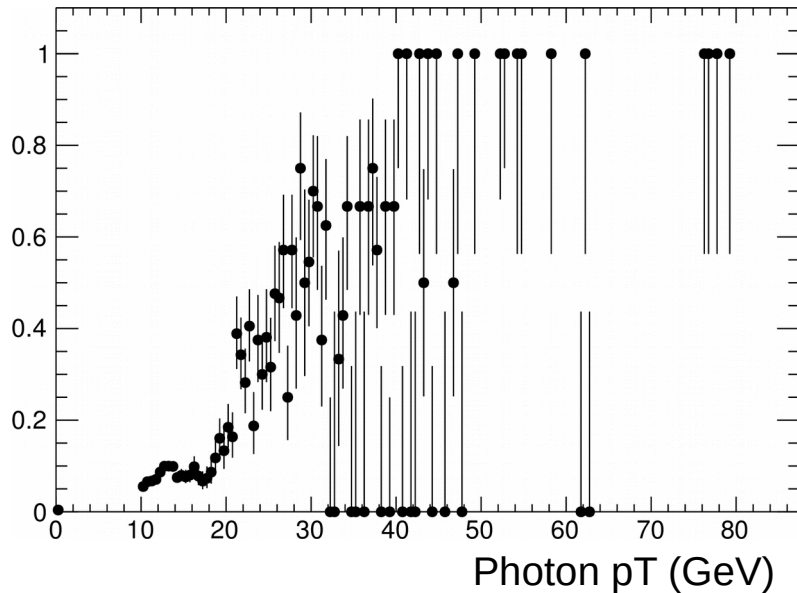
Photon-triggered data,
egcand seeds 20GeV



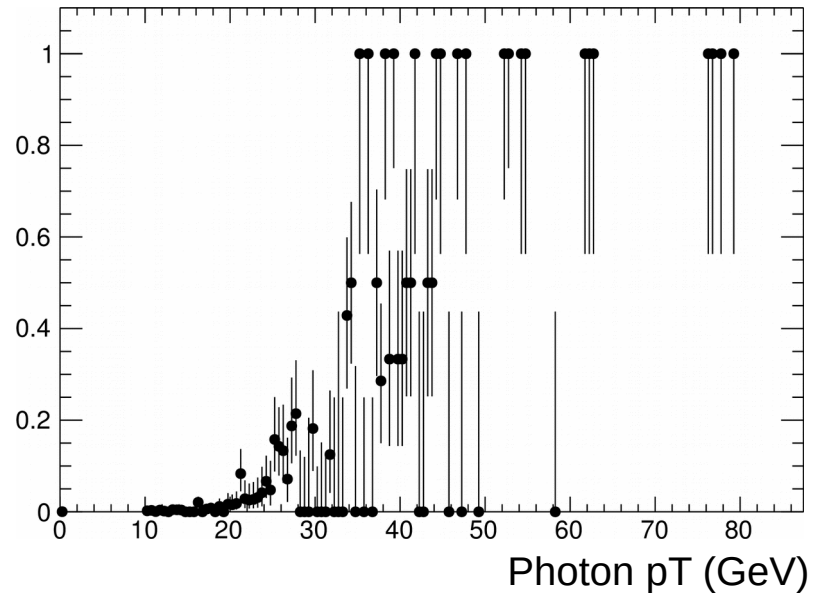
Photon-triggered data,
region seeds 20.5 GeV

Turn-On Curves

- Using the 5.02 Hydjet sample at 30kHz:
 - egcand: 493Hz at threshold of 20 GeV
 - regions: 569Hz at threshold of 20.5 GeV (suprisingly similar!)



5.02TeV Hydjet
egcand seeds 20GeV



5.02 TeV Hydjet
region seeds 20.5 GeV

Thoughts

- Reach ~95% efficiency at 60GeV @ ~550 Hz
- Reach ~100% at ~75GeV
 - Can we deal with a 5% loss of efficiency and use a 60GeV HLT trigger? Measuring the inefficiency is possible with prescaled triggers.
- Desperately need photon-embedded 5.02TeV, working on this right now