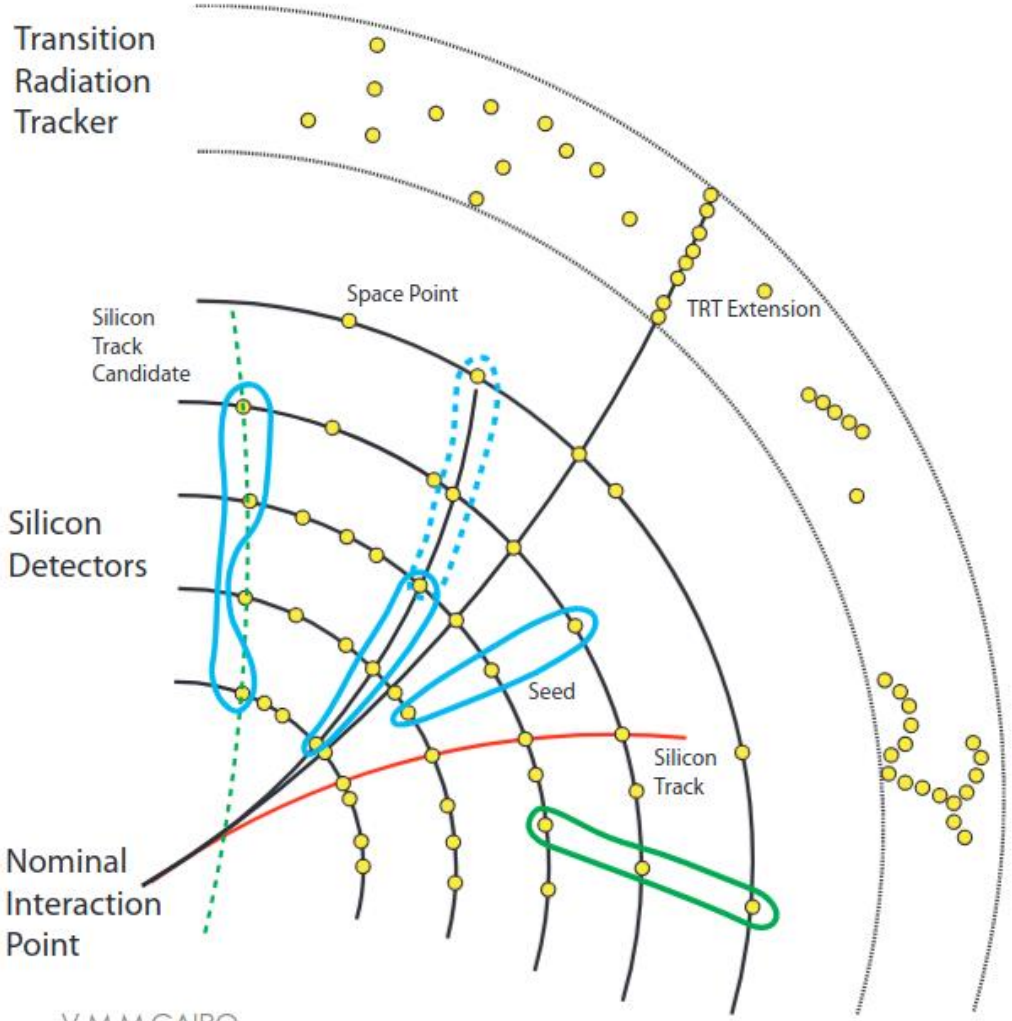
Look at updated seeding performance

FLORENCIA CASTILLO

UPGRADE TRACKING METING

THE (CURRENT)ATLAS TRACKING CHAIN



Inside-out

Space Points → Seed finding → Track Candidates (Combinatorial Kalman Filter) → Ambiguity solving → TRT Extension

from Valentina's slides link

By default, enabled only in ROIs

Outside-in

Seed finding → Track Candidates (Combinatorial Kalman Filter) → Ambiguity solving

Itk vs ID seeding strategy

- **Same strategy:**
  1. We first build strips seeds ("SSS")
  2. Then we run track finding with those
  3. And only then, we build Pixel seeds ("PPP") and make tracks from those, removing any we found previously.
  4. As a result, it will always looks like the PPP seeds are less efficient at being turned into tracks but this is not a property of the Pixel per-se, but just the result of our choice to first run the Strips seeds
- **New cuts:**
  - old : IntegerProperty m_maxsize{this, "maxSize", 50000};
    IntegerProperty m_maxsizeSP{this, "maxSizeSP", 5000};
  - new : IntegerProperty m_maxsize{this, "maxSize", 10000};
    IntegerProperty m_maxsizeSP{this, "maxSizeSP", 4096};

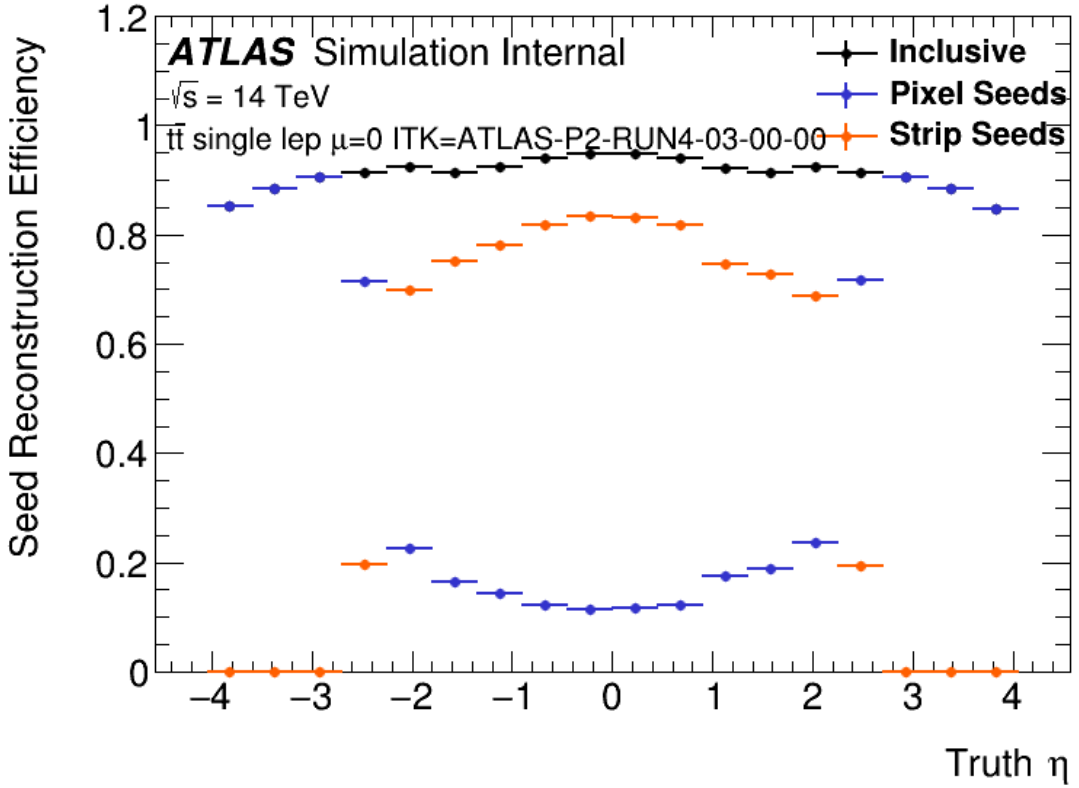
Samples and code

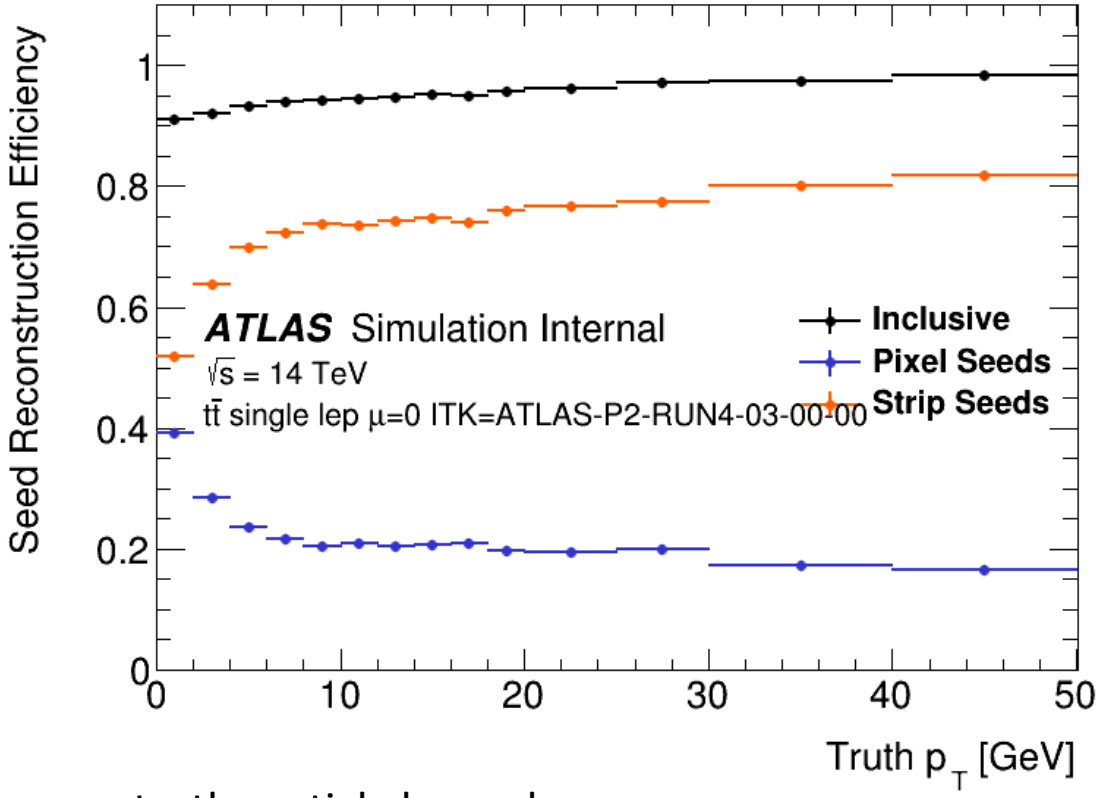
- ttbar mu 0 and mu 200 (601229) Single Lep
  - Geo tag = ATLAS-P2-RUN4-03-00-00 (rel 24.0.5)
  - PU 200 = Full In Time Truth (r14701)

- Not using IDPVM, instead I am using SeedValitionNtuple (contains the type of the seed) and TRKAnalysis (from Thomas)
  - Using the ID strategy (same codes) from Irina Ene (thanks!, some of her slides)
    - https://gitlab.cern.ch/iene/seeding-performance-plots
  - I had to addapt the SeedValitionNtuple for Itk following this commit (link) in order to add the truthBarcode and the truthMatchProb

- Studies from ID located here

ttbar single lep PU 0

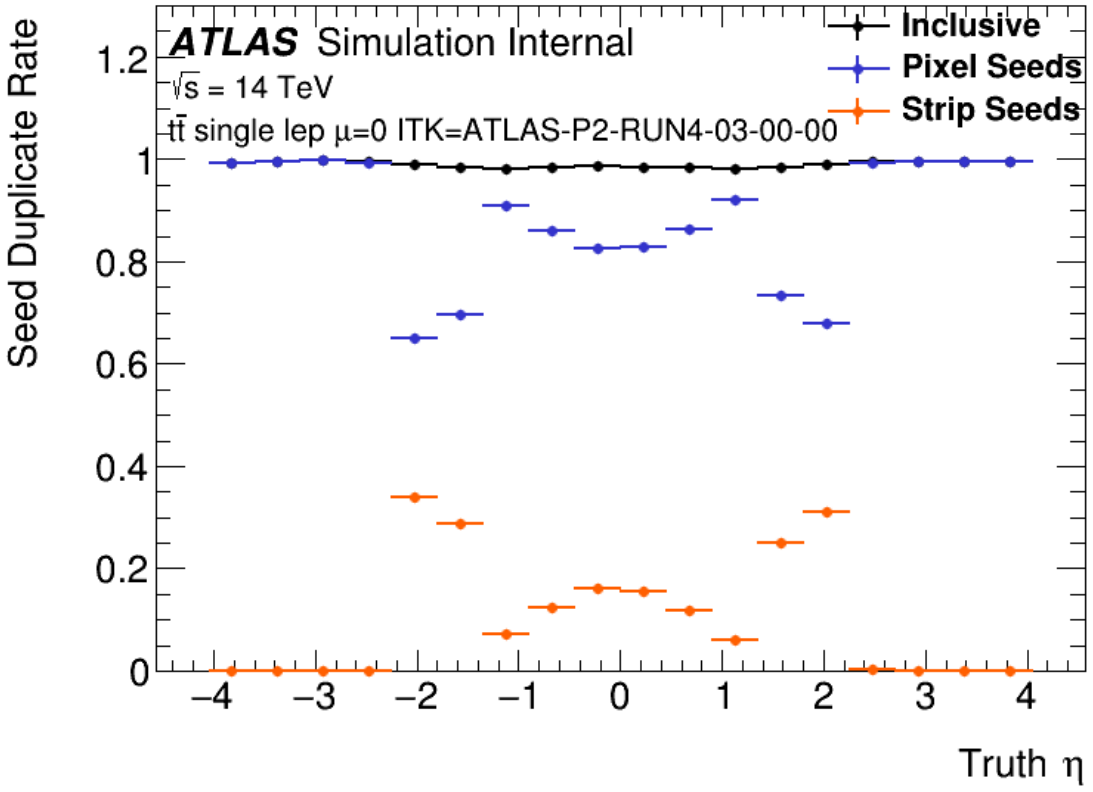


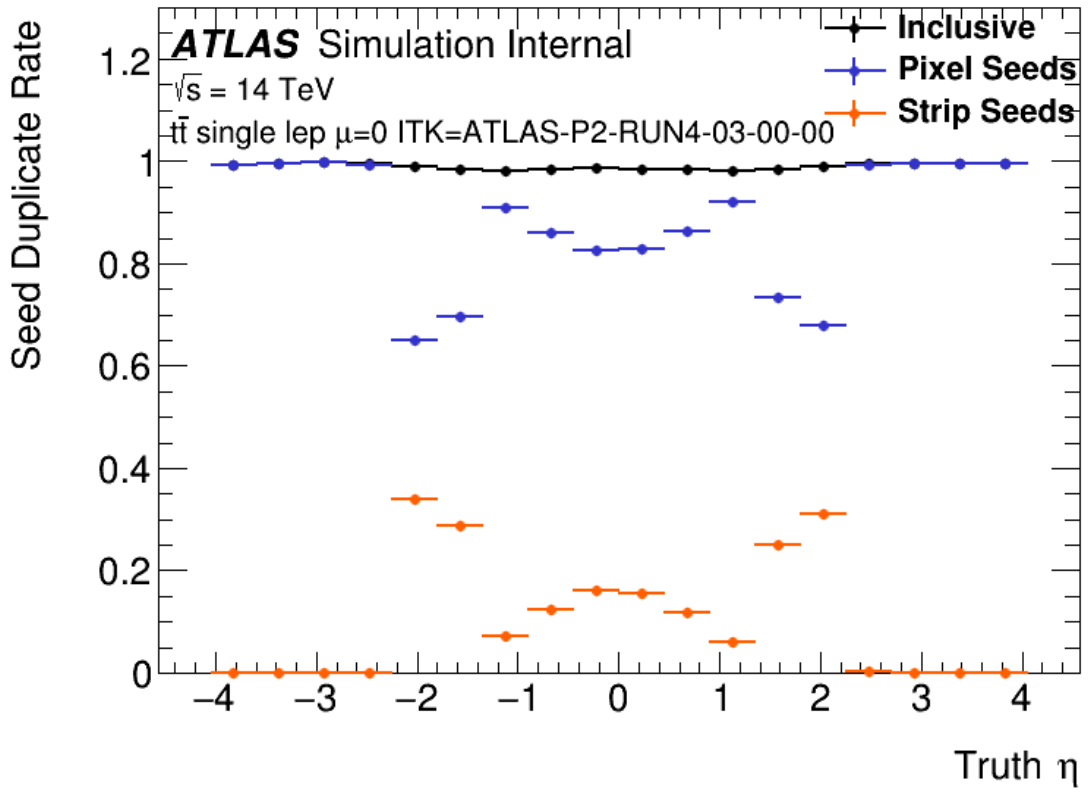


For each truth particle, retrieve all seeds that have the same truth particle barcode

- Truth particle is seed-matched if there is at least one seed with truth match probability >= 50%

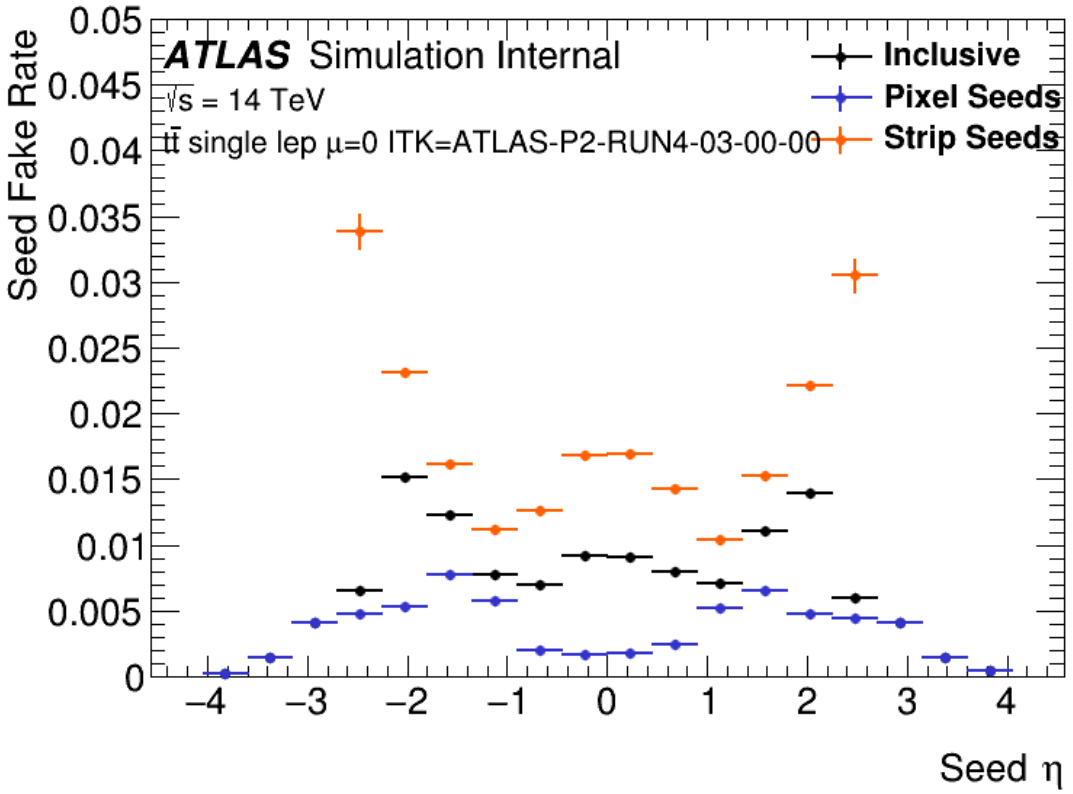
ttbar single lep PU 0

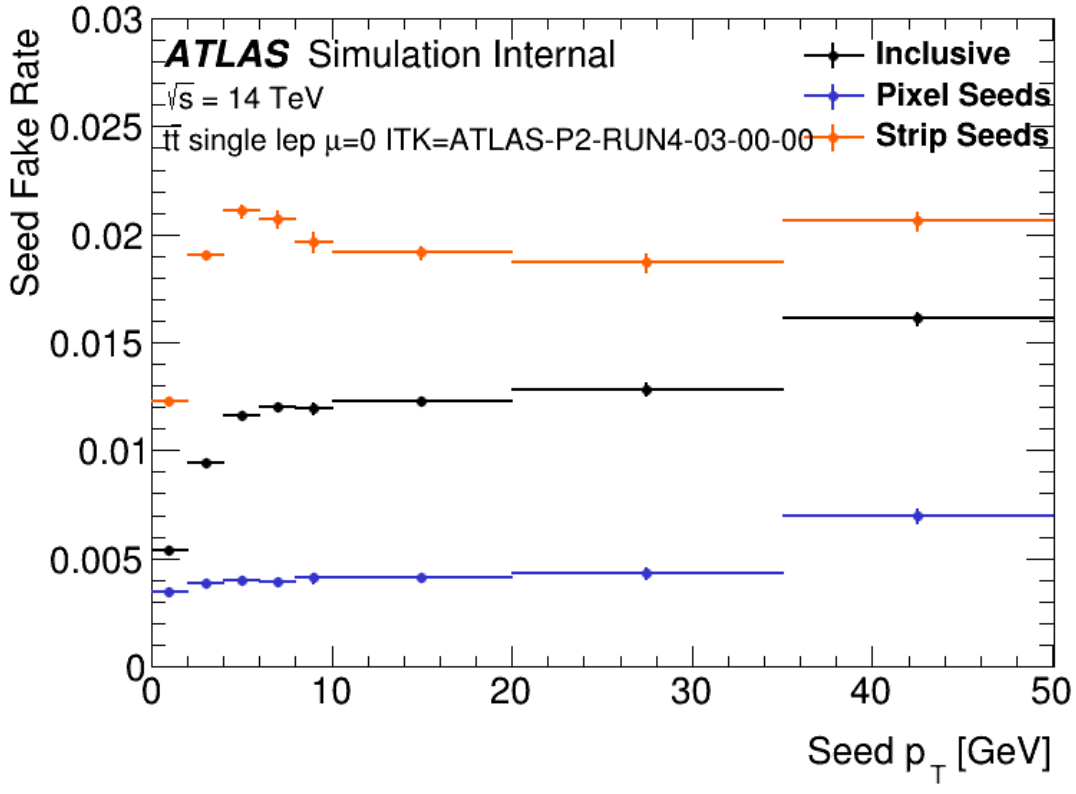




If N seeds match to same truth particle (with truth match prob >= 50%), then there are N-1 duplicate seeds

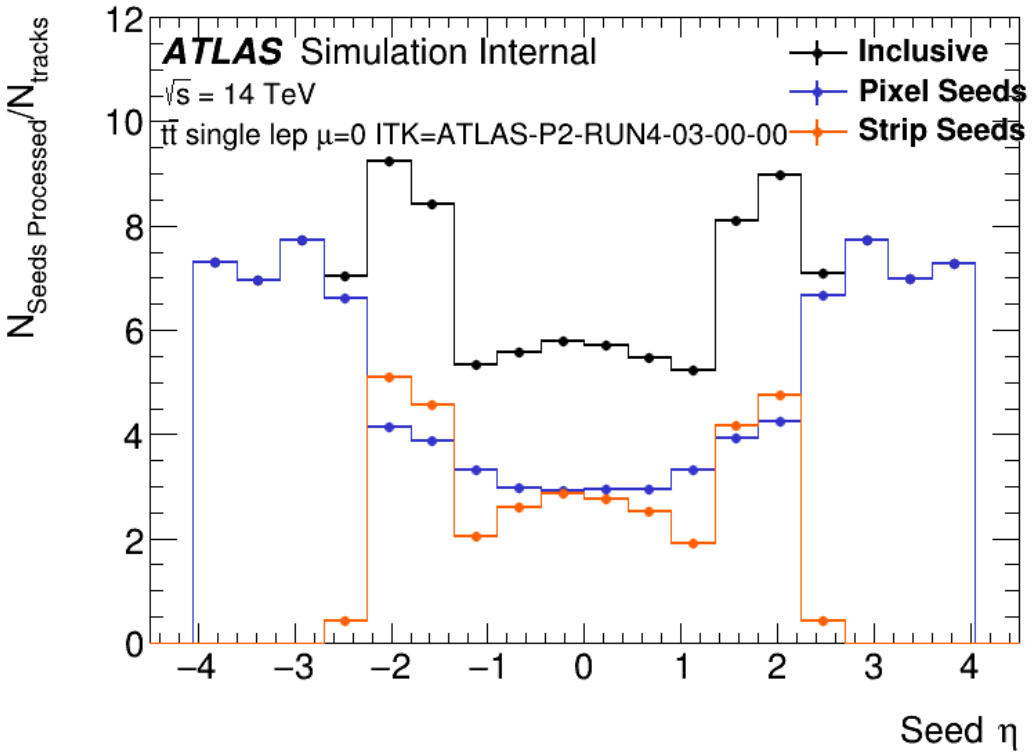
ttbar single lep PU 0 (mirar estos, com con IDPVM)

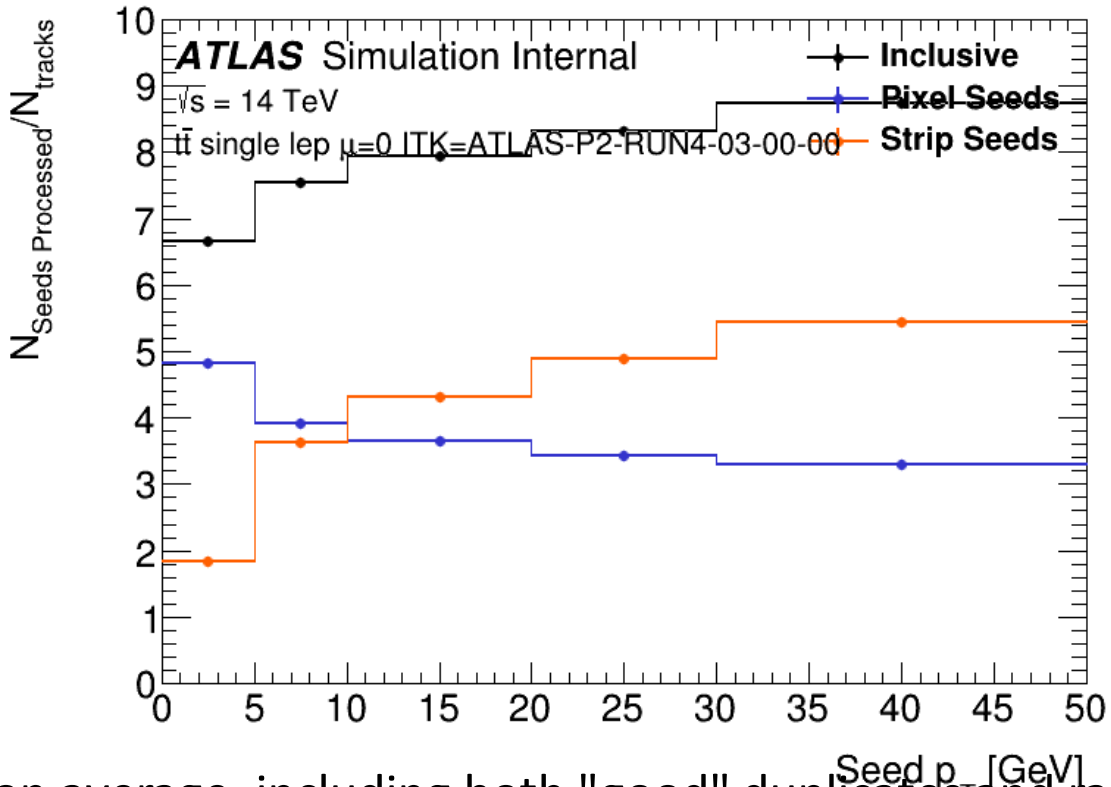




Seeds with truth match probability < 50% are considered fake seeds

ttbar single lep PU 0



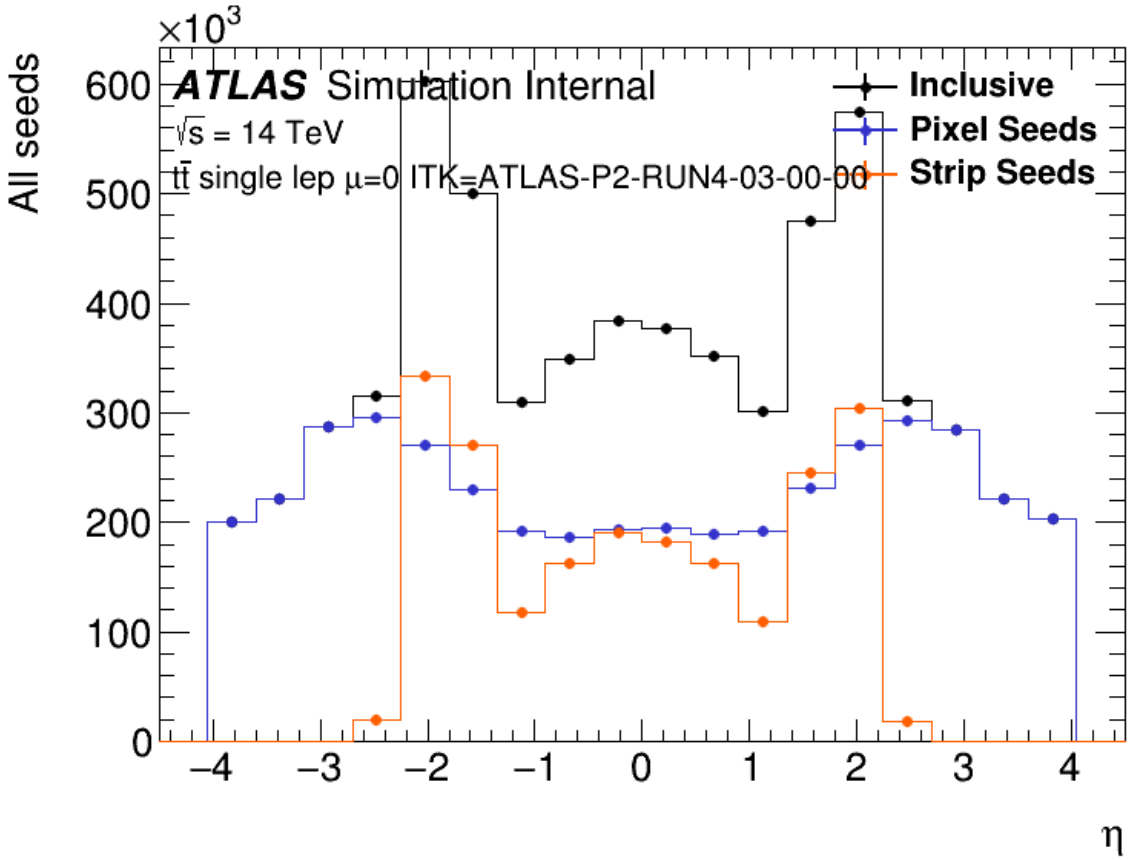


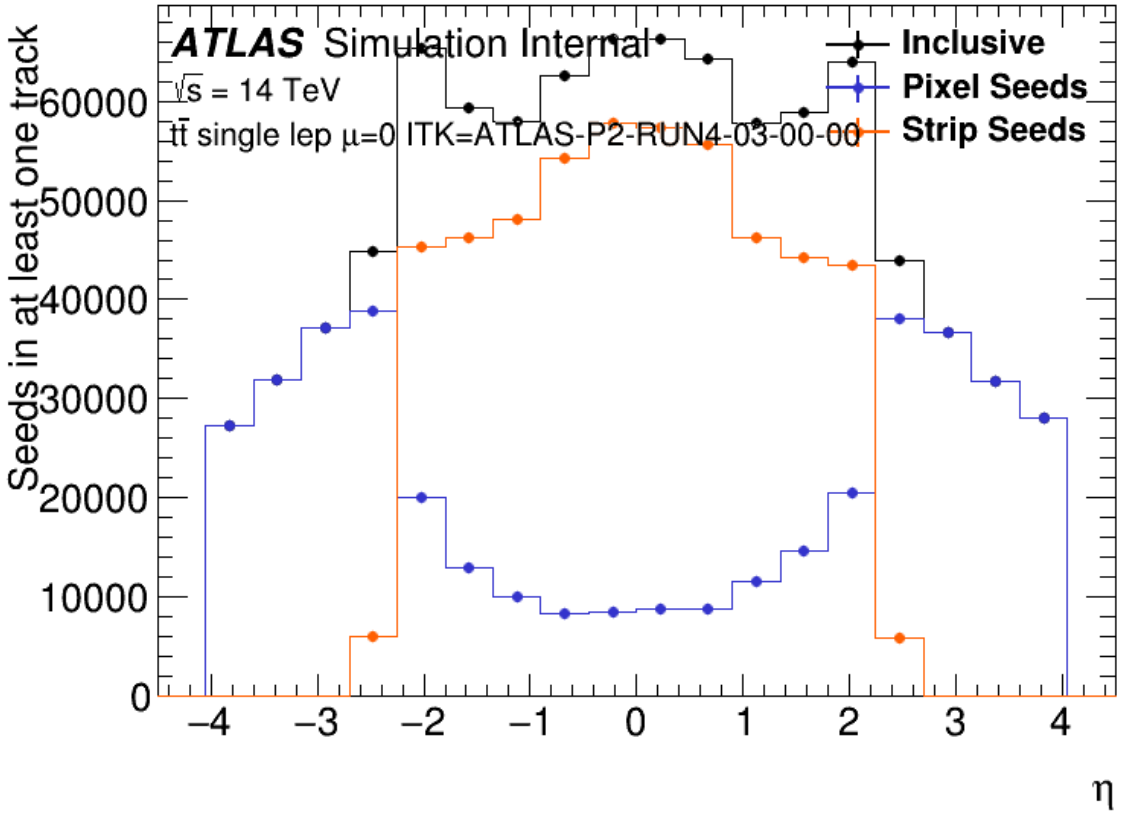
It is something like a measure of how many times - on average, including both "good" duplicates and random combinatorics - we process a seed per track we find

ttbar single lep PU 0

```
All seeds Pixel  4155766.0
With givesTrack Pixel  393855.0
All seeds Strip  2115368.0
With givesTrack Strip  510362.0
All seeds  6271134.0
With givesTrack  904217.0
Seeding Redundancy = AllSeeds / With givesTrack  6.935430322588494
Seeding Redundancy_pix = AllSeeds PPP /  With givesTrack  4.595983043893224
Seeding Redundancy_sct = AllSeeds SSS /  With givesTrack  2.339447278695269
 actualmu  0.0
```

ttbar single lep PU 0





ttbar single lep PU 200