

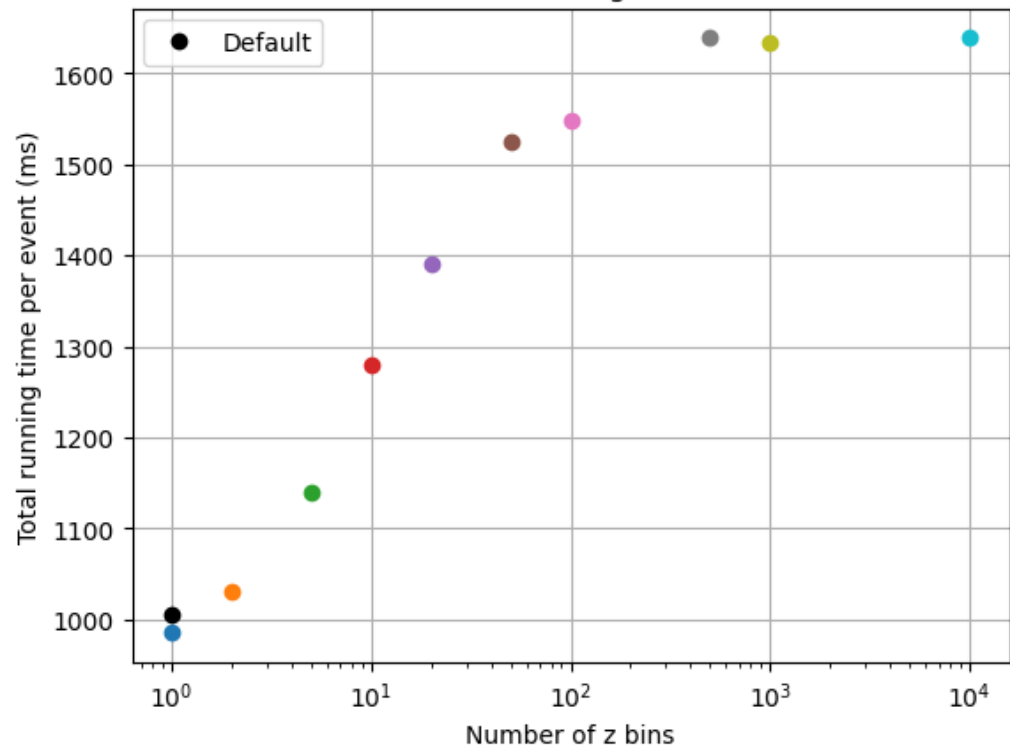
Tracking with Hashing

Current state

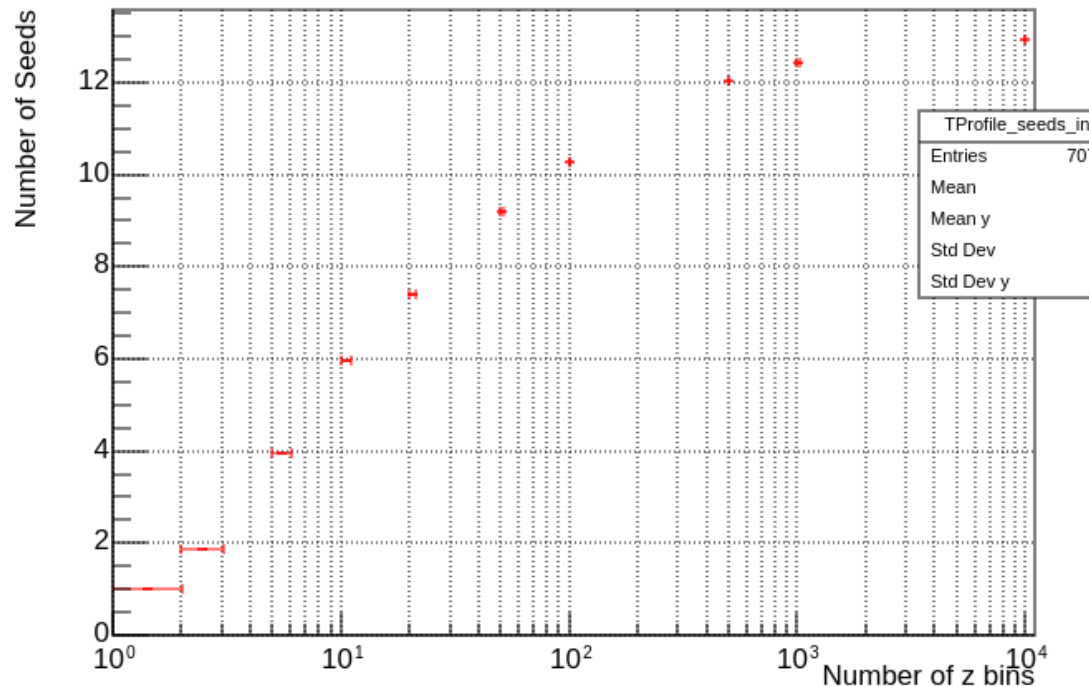
Jeremy Couthures

Barrel layer 0 merged bucket bin: timing plateauing

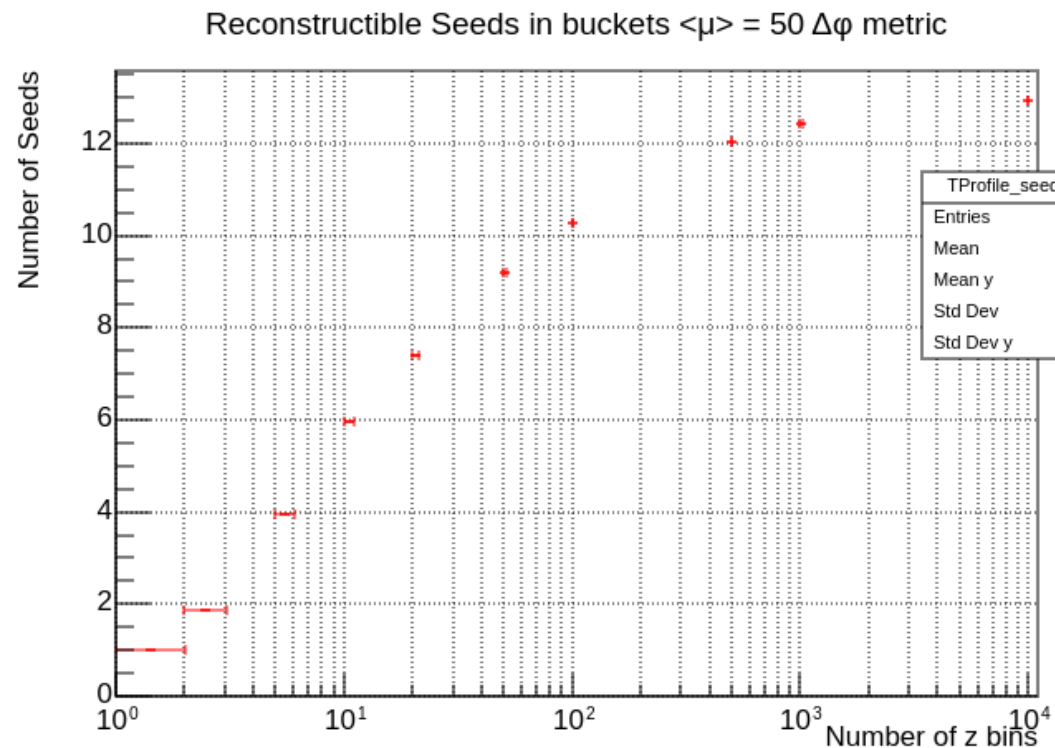
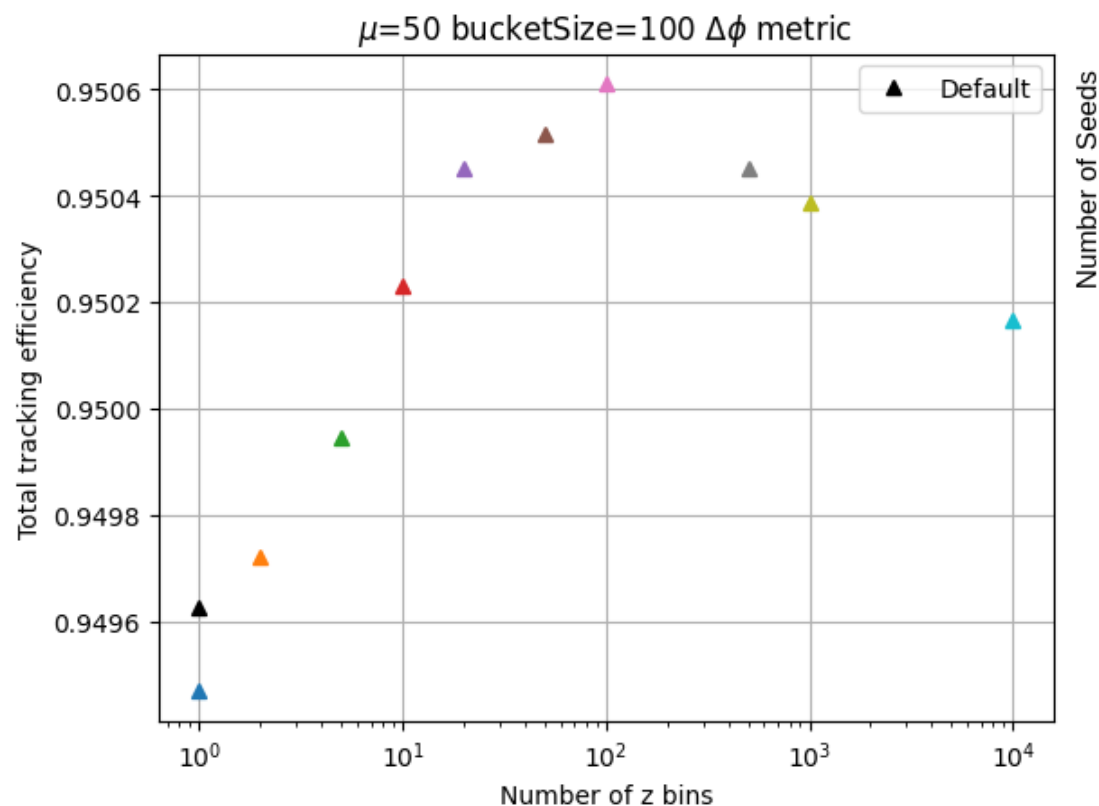
$\mu=50$ bucketSize=100 $\Delta\phi$ metric
w/o Hashing time



Reconstructible Seeds in buckets $\langle\mu\rangle = 50$ $\Delta\phi$ metric



Barrel layer 0 merged bucket bin: timing plateauing



Seeding: Skipping triplets check with sets

- **Event 98: Hashing mu=50 bucketSize=100**
- **9860 Space Points → ~100.000.000 possible doublets**

Overlap indicator



Set name	Set size	nSkipped	Ratio
Bad bottom	24.433.199	322.132.498	13,18
Good bottom	3.592.664	63.294.324	17,62
Bad top	30.363.102	392.248.454	12,92
Good top	4.973.975	91.166.619	18,33
Triplets	18.204.058	269.635.750	14,81
Seeds	5.623	x	x

Total running time x1.5

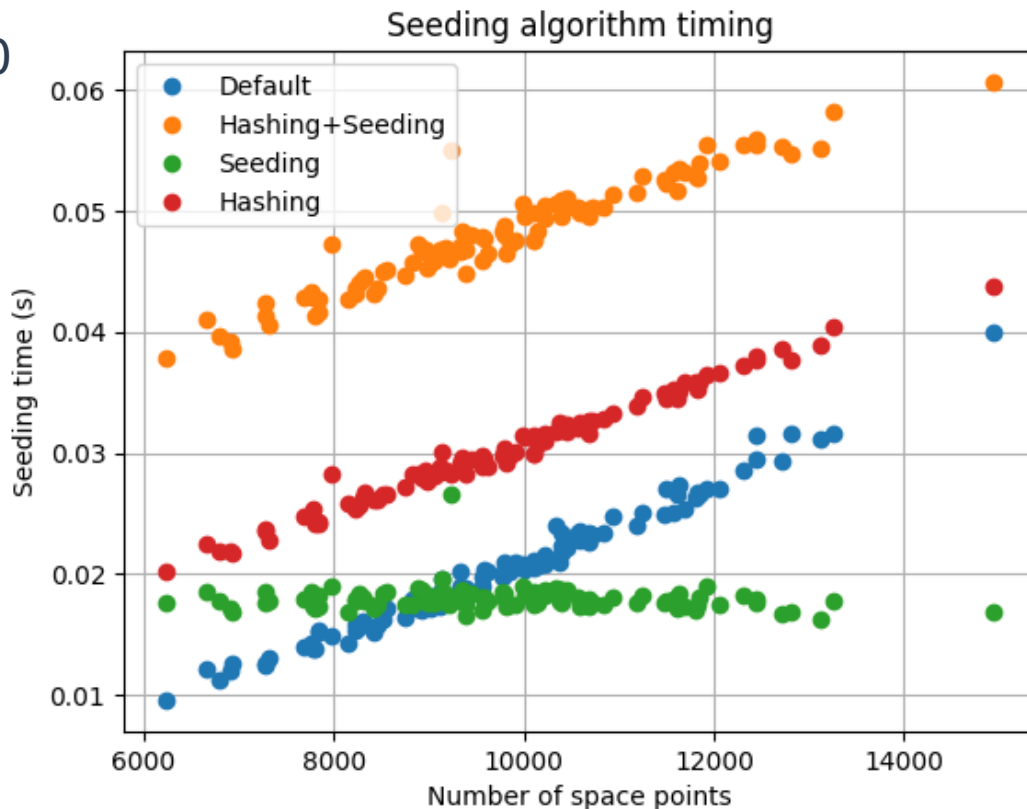
Timing vs number of space points

$\mu = 50$; 100 z bins ; bucket size 100

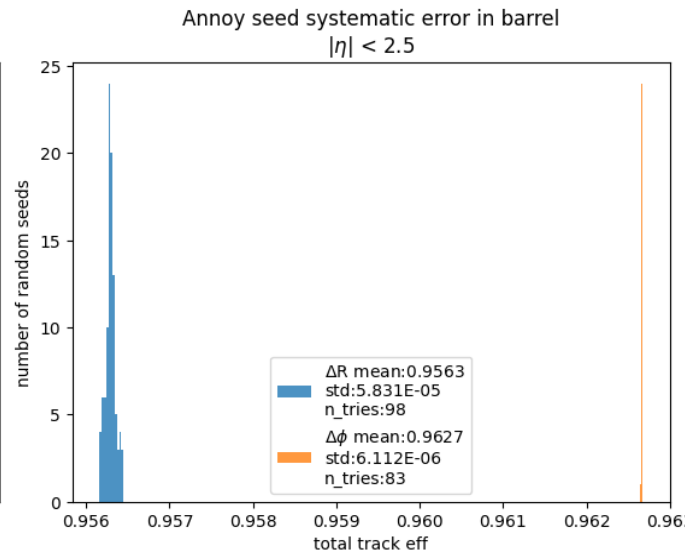
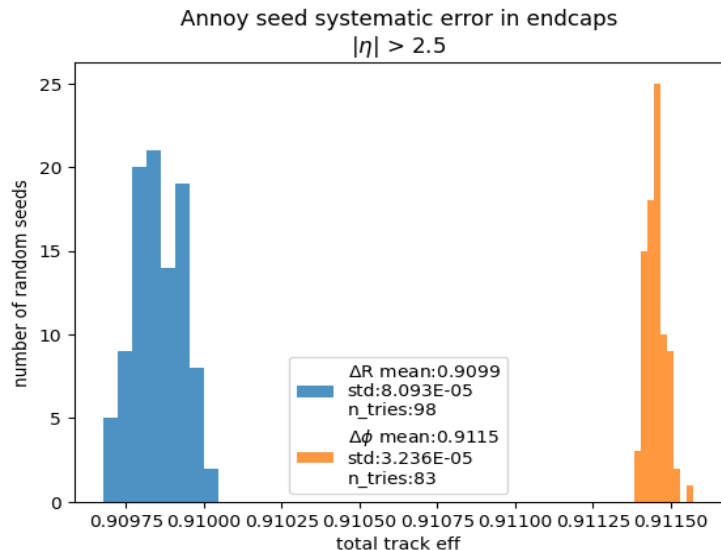
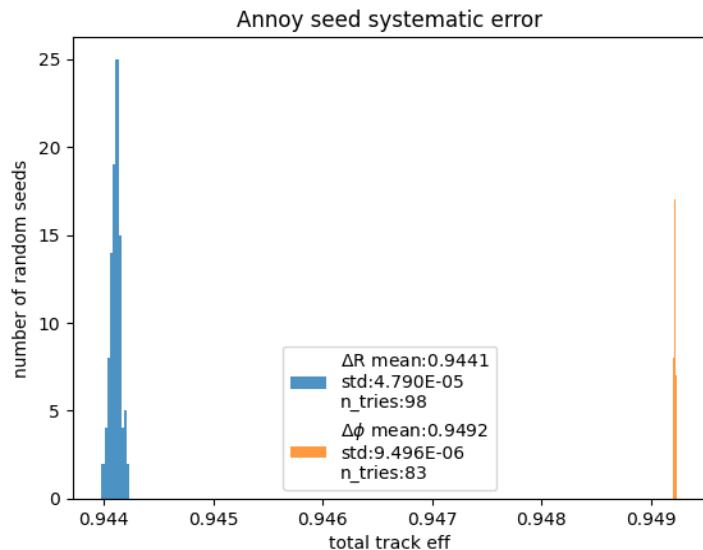
From the plot:

- Default > linear(nSP)
- Hashing ~ linear(nSP)
- Seeding ~ constant
- Hashing+Seeding >> Default

Hashing code still not optimized
for binning



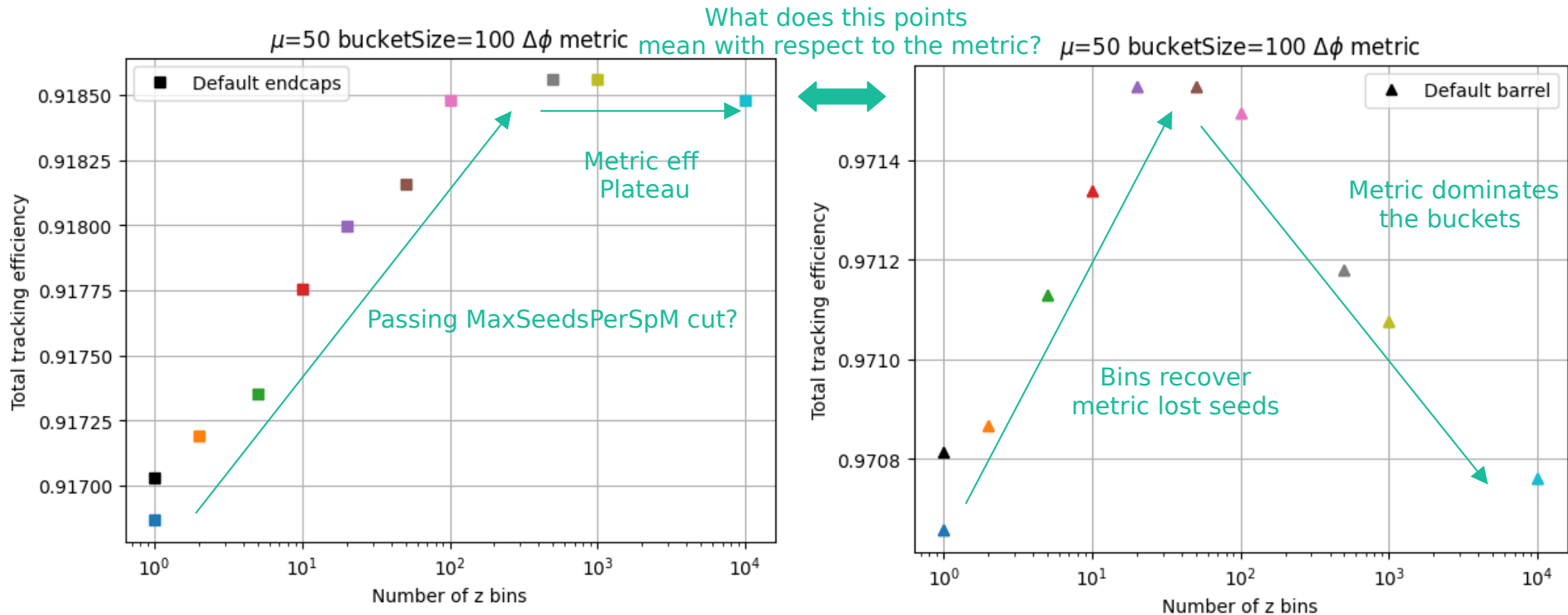
Annoy seed systematic error



1000 events
in each try

$\Delta\phi$ is better

Barrel layer 0 merged bucket bin: trackeff

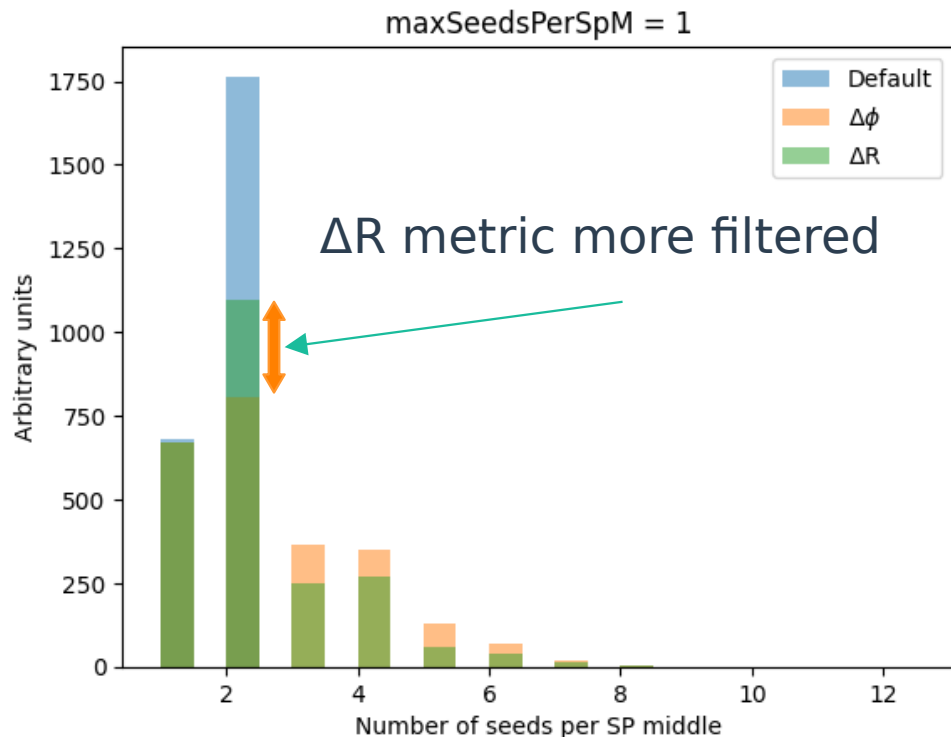


Seeding: Skipping triplets check with sets

- **Use 5 sets:**
 - Bad bottom: stores incompatible (middle, bottom) space points
 - Good bottom: stores compatible (middle, bottom) space points
 - Bad top: stores incompatible (middle, top) space points
 - Good top: stores compatible (middle, top) space points
 - Triplets: stores every checked (middle, bottom, top) space points
- + **Set seed container from before: stores compatible triplets**

MaxSeedsPerSpM and ΔR metric

On 1 event:



Filtered Middle Space points are on the maxSeedsPerSpM bin

Some of the “Buckets shared Middle Space points” are on the bins after the maxSeedsPerSpM bin

Differences in the bins before maxSeedsPerSpM correspond to lost seeds

Default nSeeds: 4208

$\Delta\phi$ nSeeds: 6053

ΔR nSeeds: 5300