# Measurement of $R_b$ of Z hadronic decay

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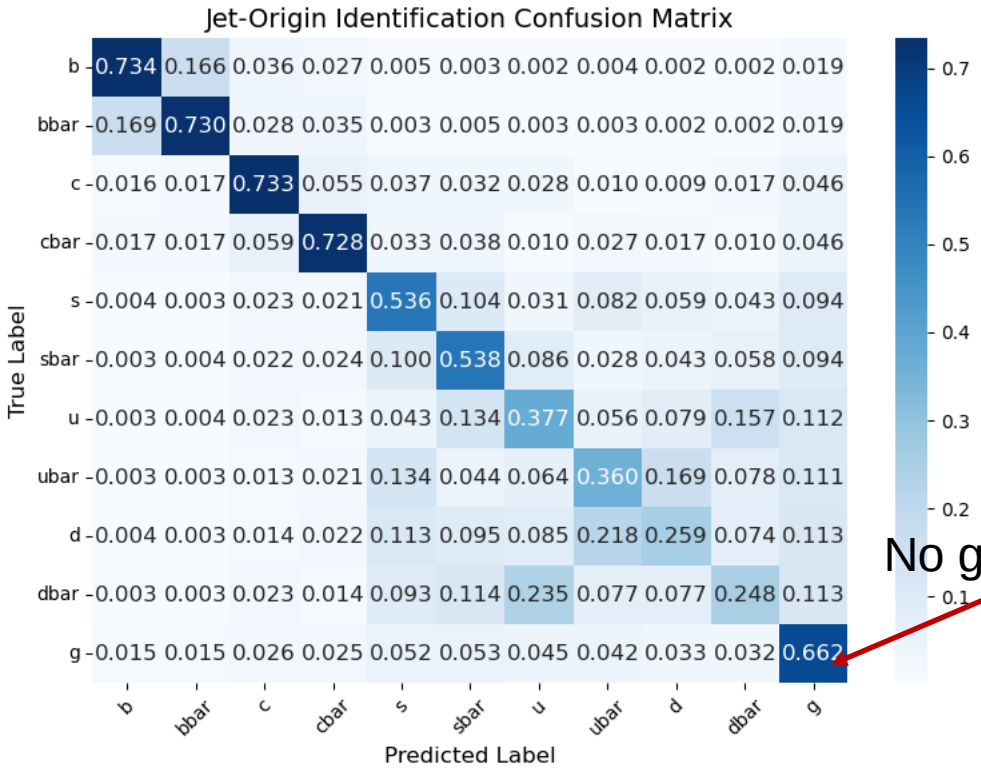
Status:

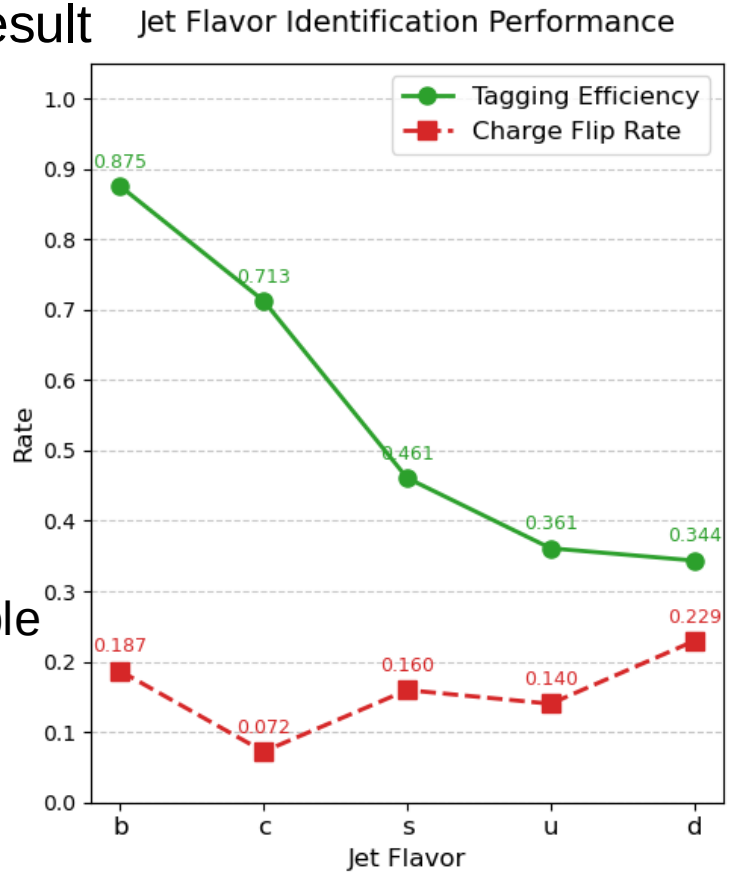
- ✓ Samples (250*200 for each flavor, not enough)
- ✓ Pre-processing
- ParticleNet Training (Undergoing)
- ……

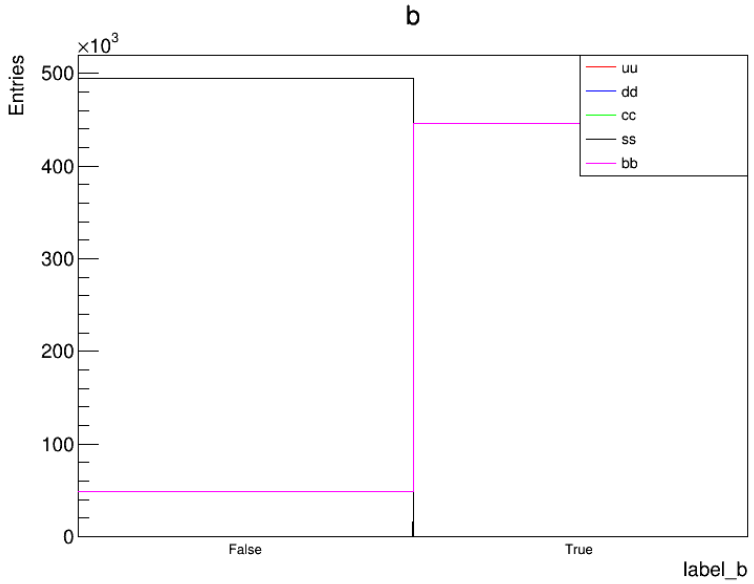
/cefs/higgs/zhangkl/AI/datasets

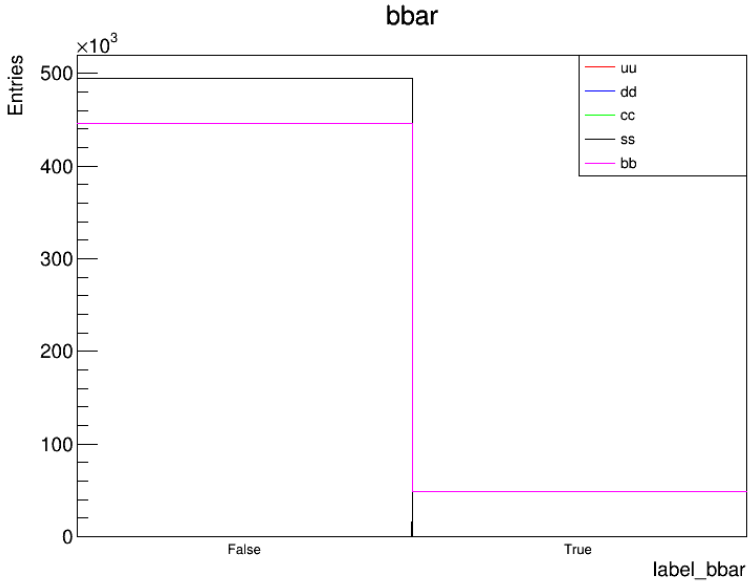
Pre-training model result




No gluon sample




Glance over pre-process results (Should be symmetric)

```
(long long) 0
root [6] tree->GetEntries("label_b==1")
(long long) 49244
root [7] tree->GetEntries("label_bbar==1")
(long long) 49256
root [8] tree->GetEntries()
(long long) 98500
```

Newly added

Jet label: negative for antiquark, positive for quark. Abs value is event label.

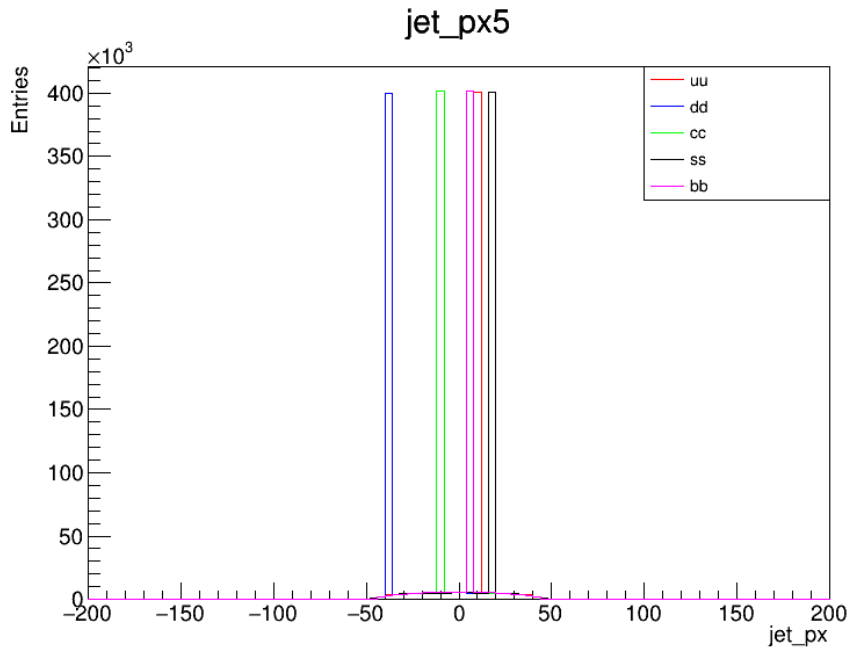
Next step:

- More samples
- Particle Net training
- Roughly estimation on Rb
- ……

For cross section, refer to: cepc_sample_note_latest.pdf, https://docs.ihep.ac.cn/link/AA749814584F654E8FBAADA4D766223B1F

| ECM | Z process | H process | Path | CEPCSW Release | EvtNumber | Sim+Digi+Trk | Rec | Status |
|---|---|---|---|---|---|---|---|---|
| 240 | mm | bb | /cefs/higgs/zhangkl/Production/25035/E240_mmHbb | 25.3.5 | 500k | D | D | D |
| 240 | mm | cc | /cefs/higgs/zhangkl/Production/25035/E240_mmHcc | 25.3.5 | 500k | D | D | D |
| 240 | mm | tautau | /cefs/higgs/zhangkl/Production/25035/E240_mmHe3e3 | 25.3.5 | 500k | D | D | D |
| 240 | mm | ww(fullhad) | /cefs/higgs/zhangkl/Production/25035/E240_mmHww | 25.3.5 | 500k | D | D | D |
| 240 | mm | zz(fullhad) | /cefs/higgs/zhangkl/Production/25035/E240_mmHzz | 25.3.5 | 500k | D | D | D |
| 240 | mm | gg | /cefs/higgs/zhangkl/Production/25035/E240_mmHgg | 25.3.5 | 500k | D | D | D |
| 240 | mm | ss | /cefs/higgs/zhangkl/Production/25035/E240_mmHss | 25.3.6 | 500k | | | |
| | | | | | | | | |
| 91.2 | bb | | /cefs/higgs/zhangkl/Production/25035/E91.2_eebb | 25.3.6 | 100k | D | | |
| 91.2 | cc | | /cefs/higgs/zhangkl/Production/25035/E91.2_eecc | 25.3.6 | 100k | D | | |
| 91.2 | dd | | /cefs/higgs/zhangkl/Production/25035/E91.2_eedd | 25.3.6 | 100k | D | | |
| 91.2 | uu | | /cefs/higgs/zhangkl/Production/25035/E91.2_eeuu | 25.3.6 | 100k | D | | |
| 91.2 | ss | | /cefs/higgs/zhangkl/Production/25036/E91.2_eess | 25.3.6 | 100k | D | | |

# Backup: pre-process results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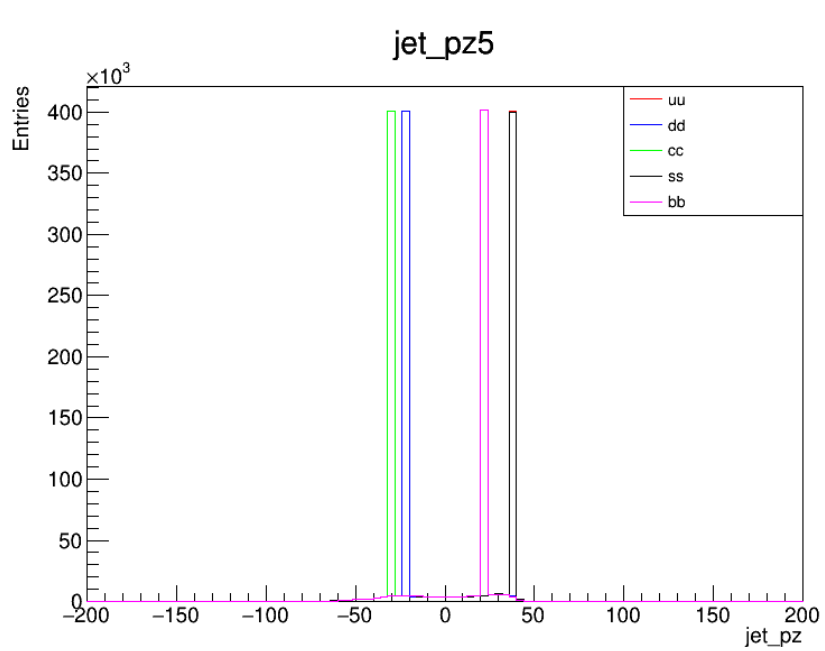
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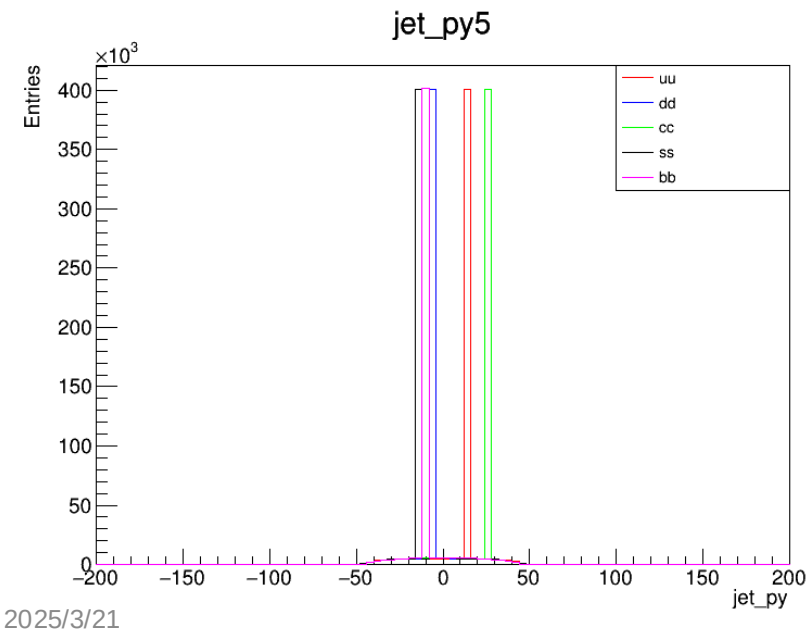
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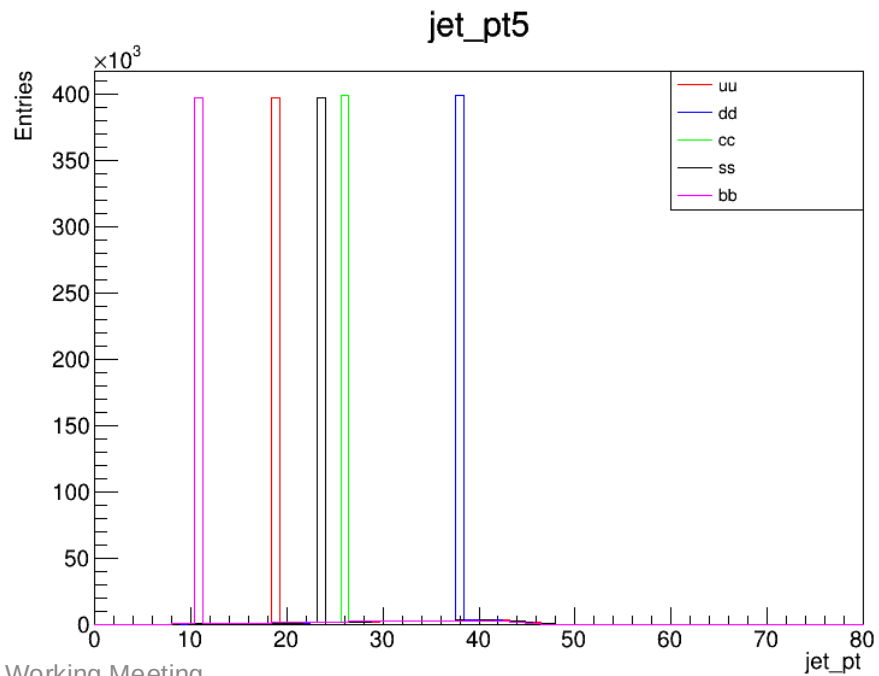
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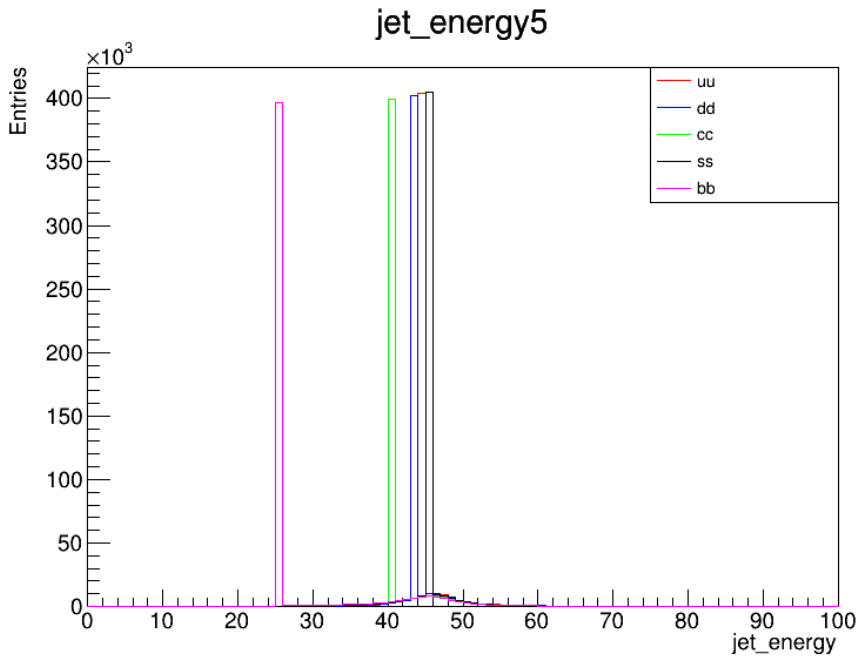
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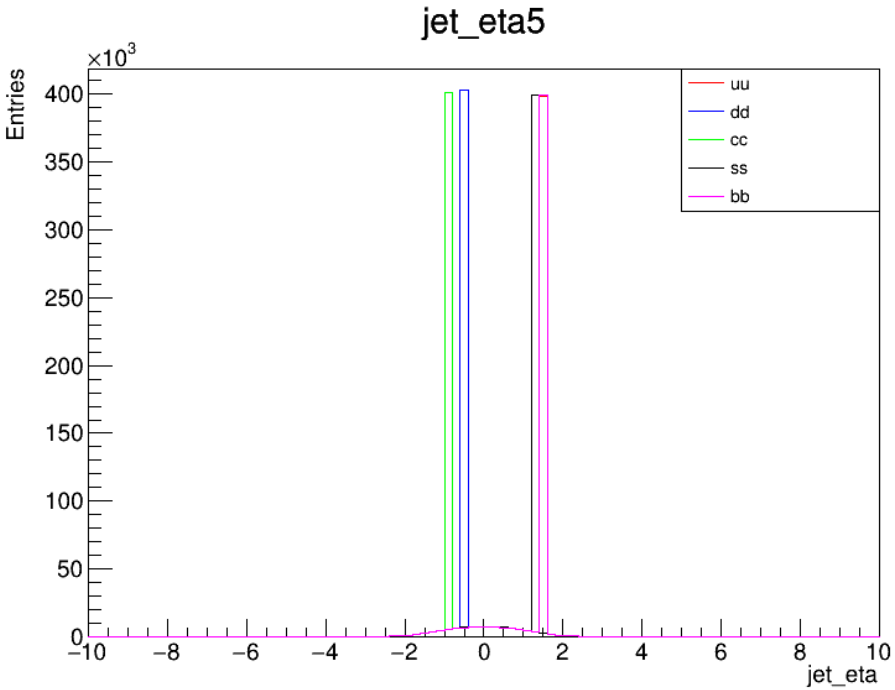
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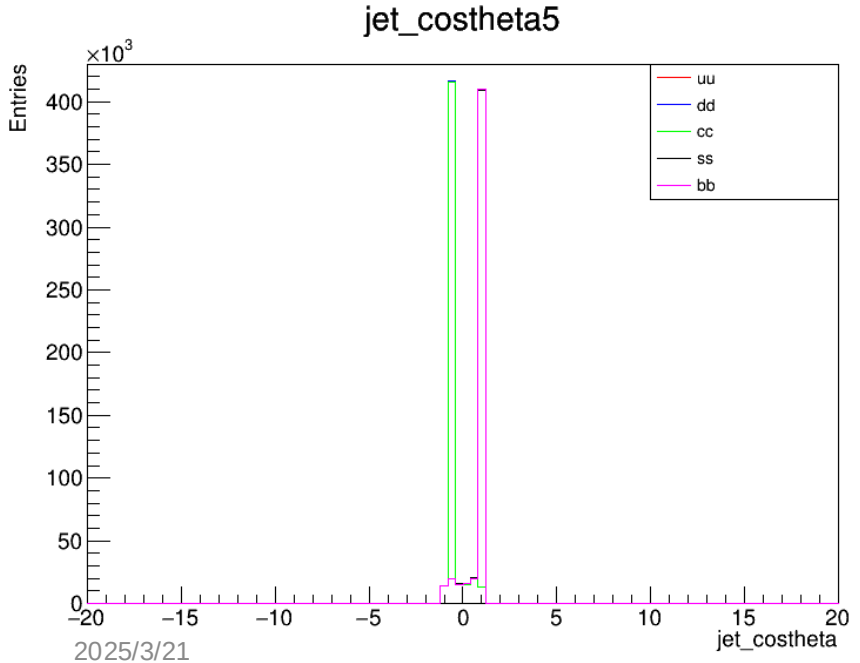
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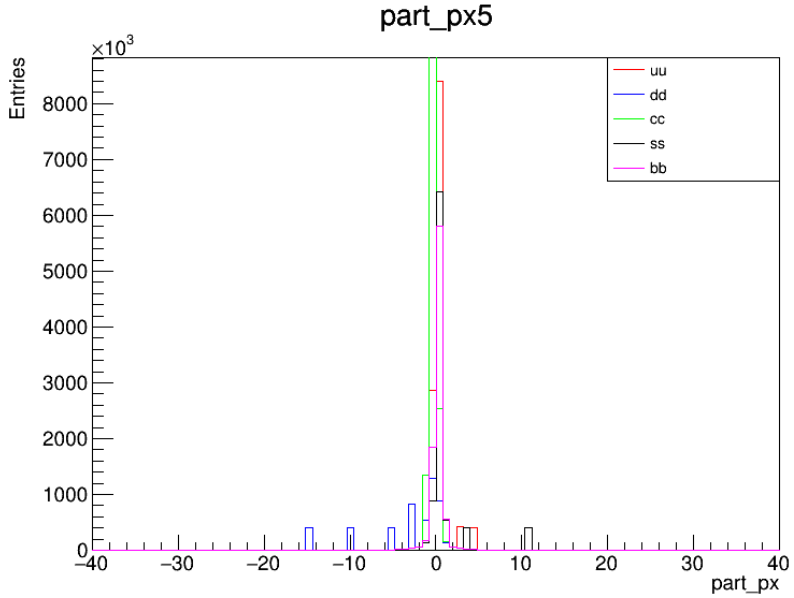
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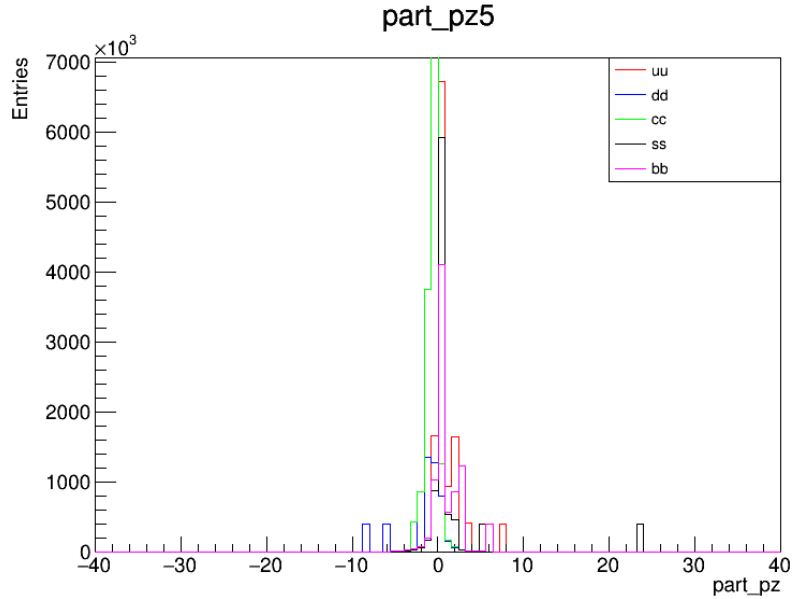
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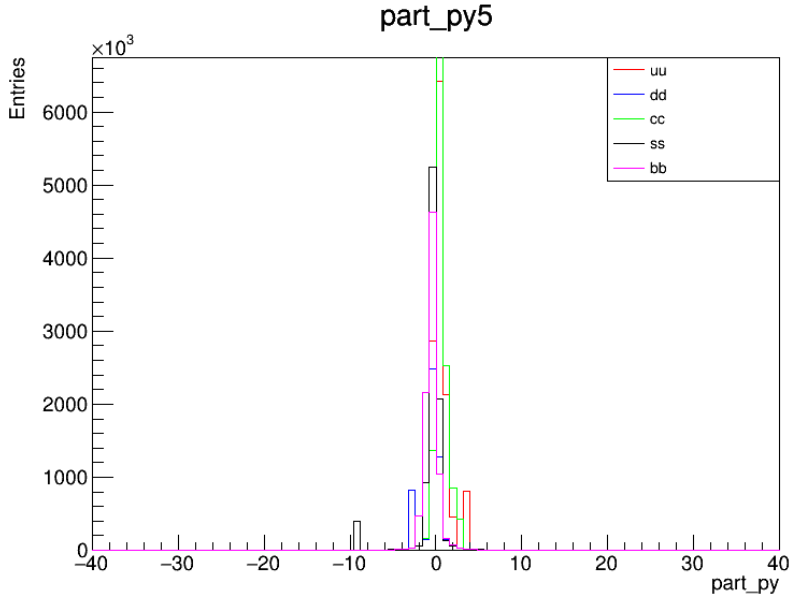
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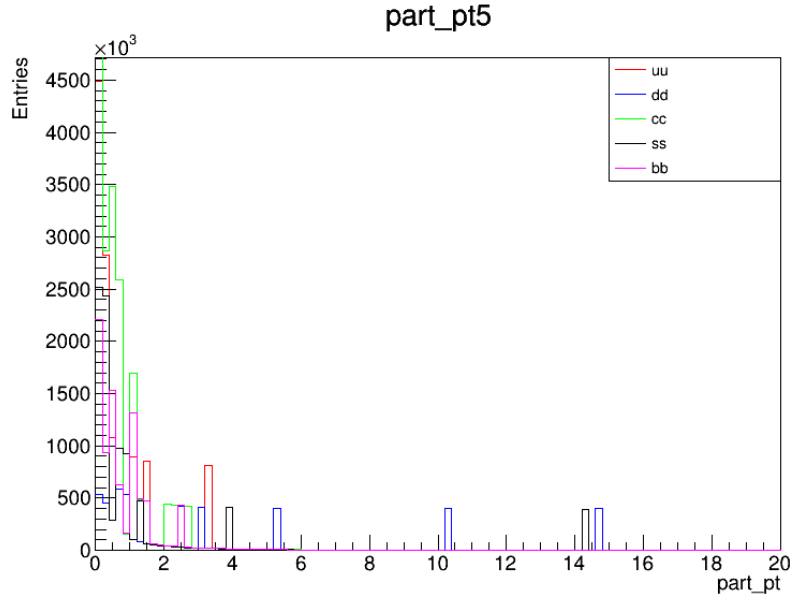
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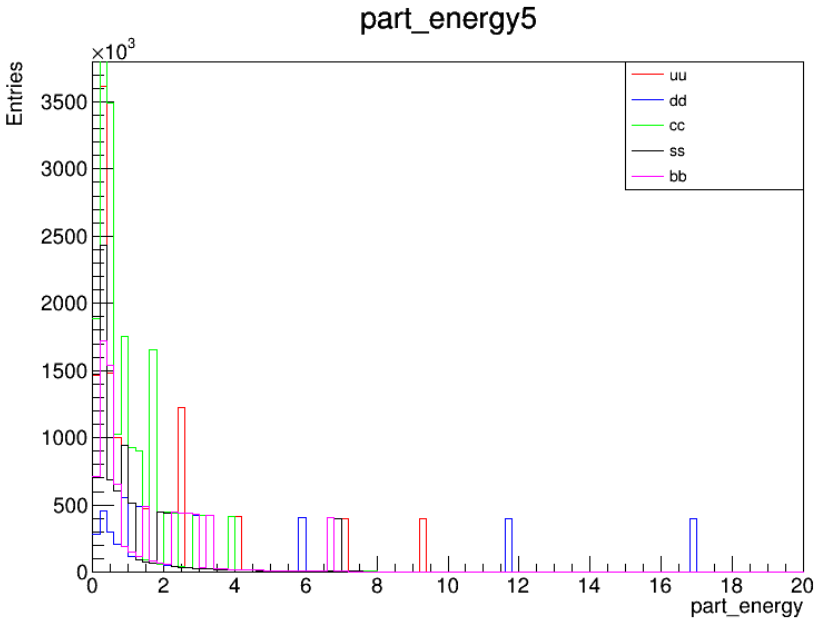
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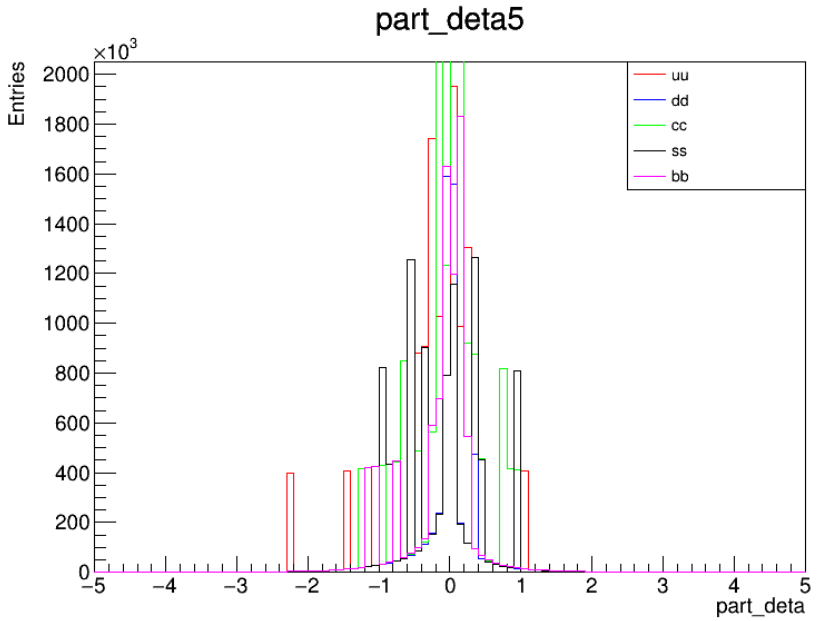
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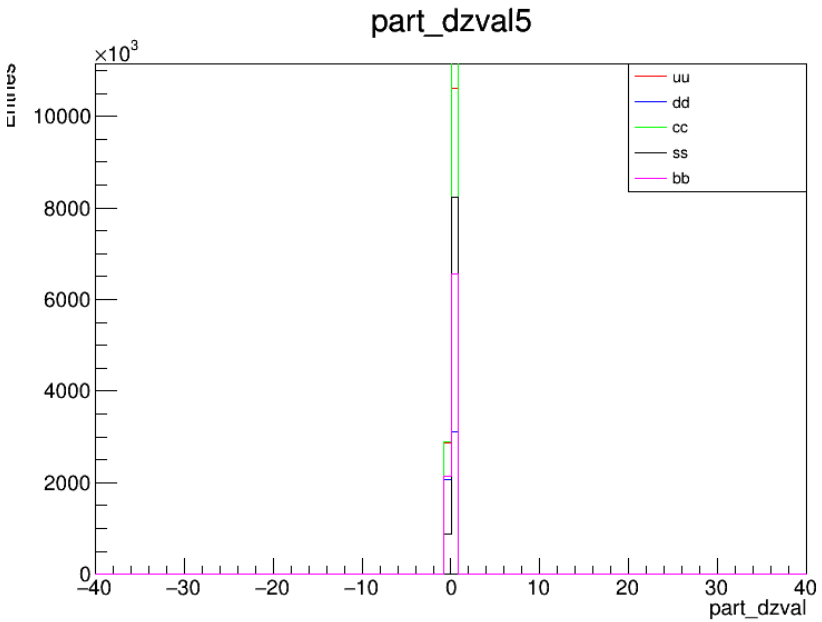
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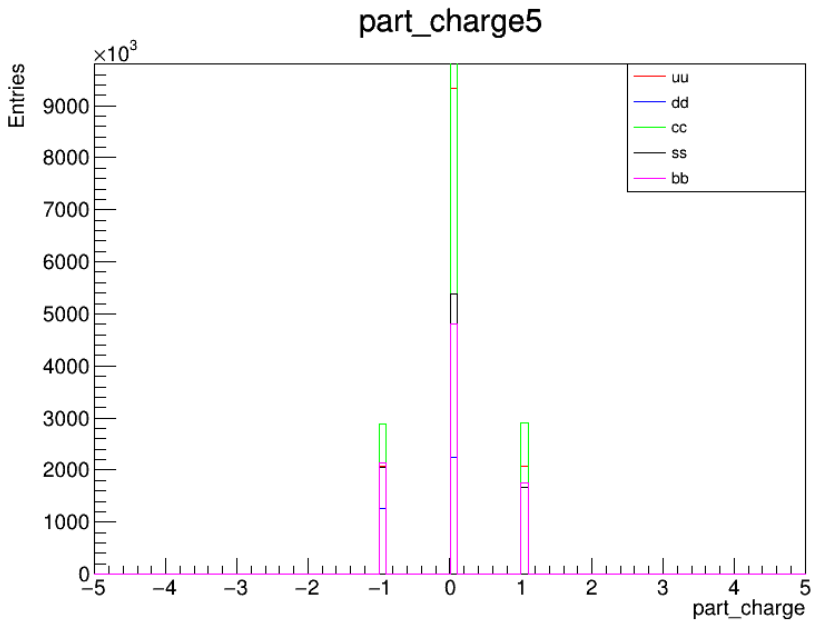
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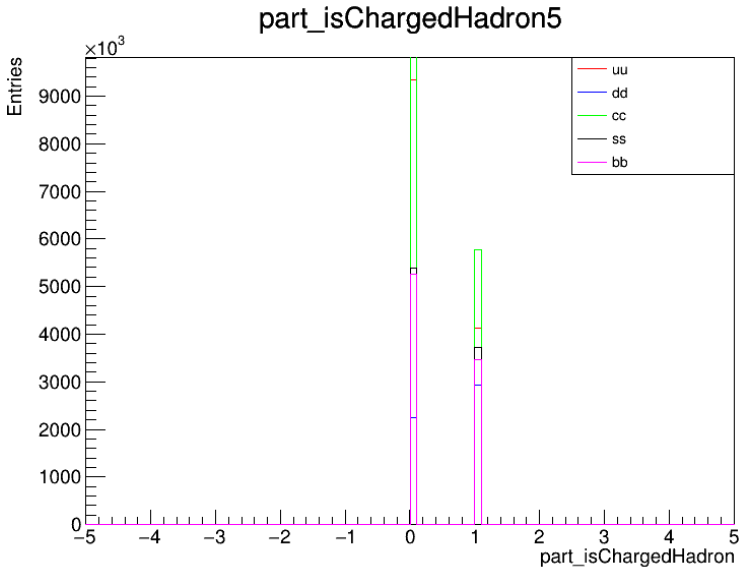
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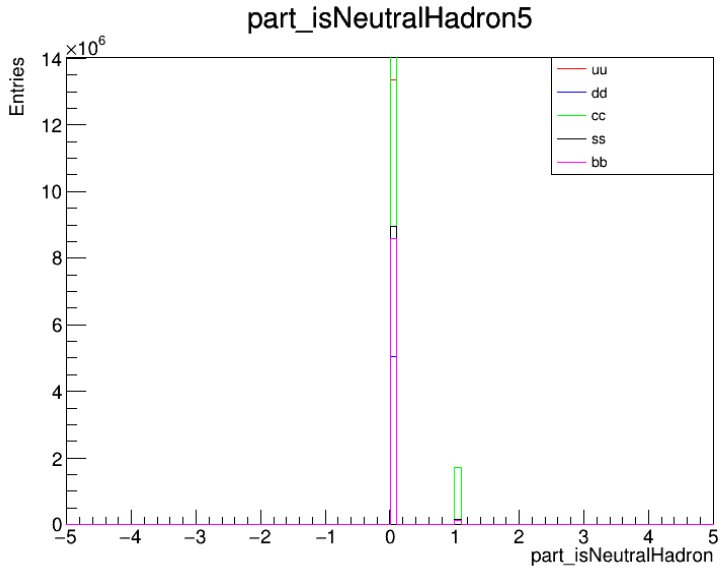
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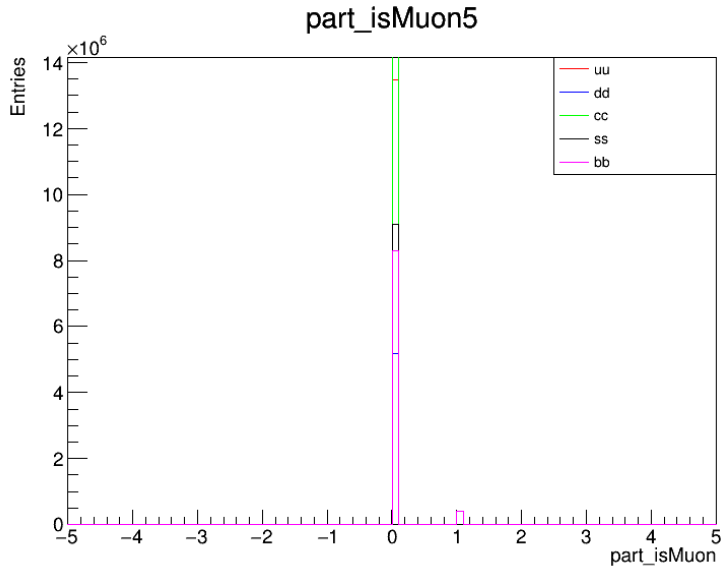
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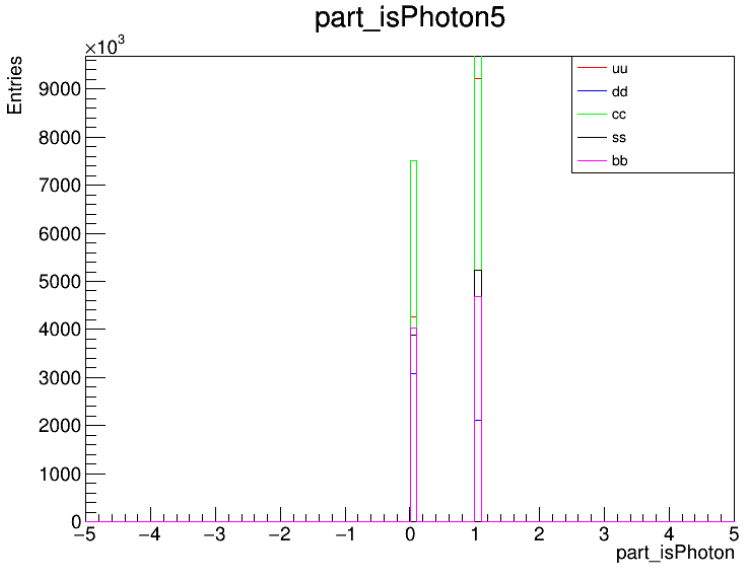
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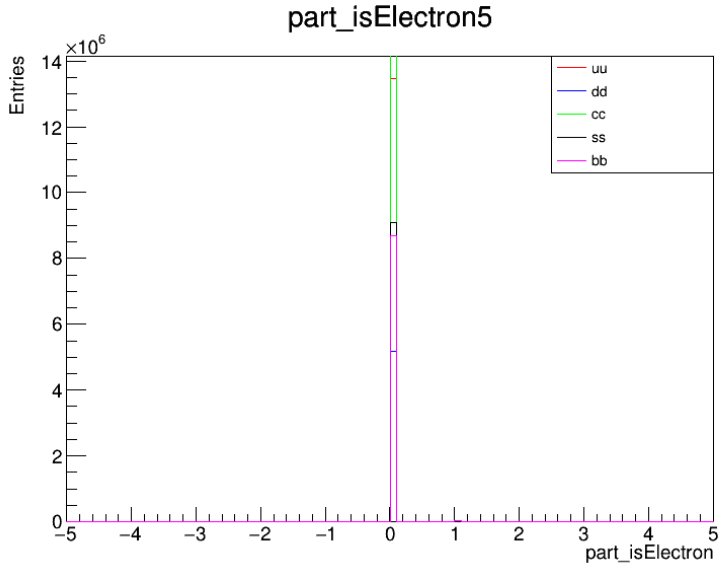
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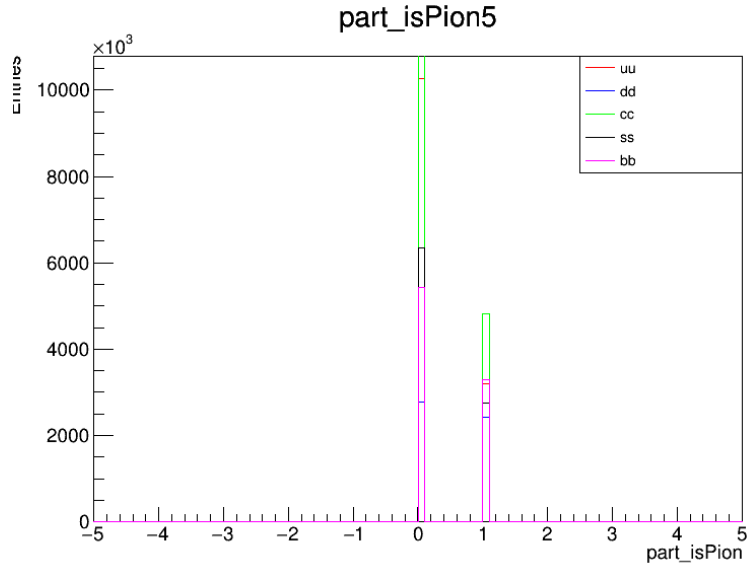
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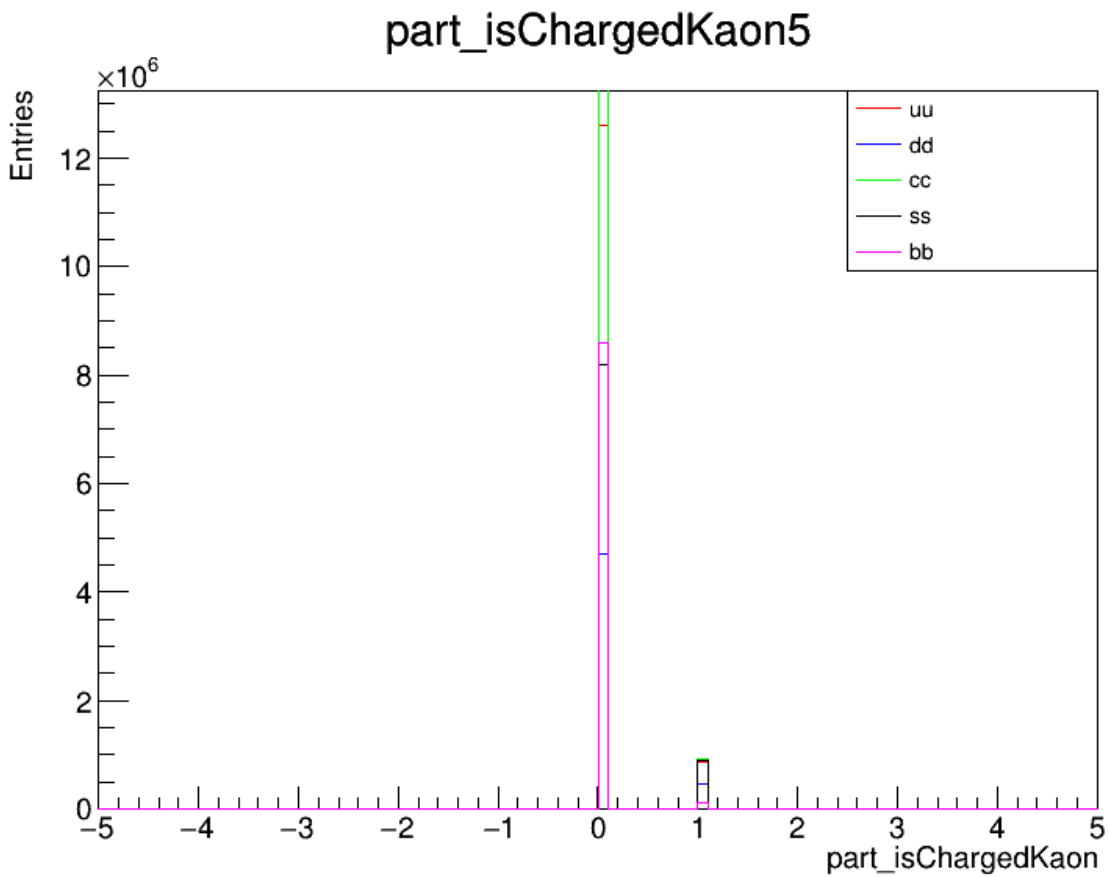
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8
6
4
2
0
−5
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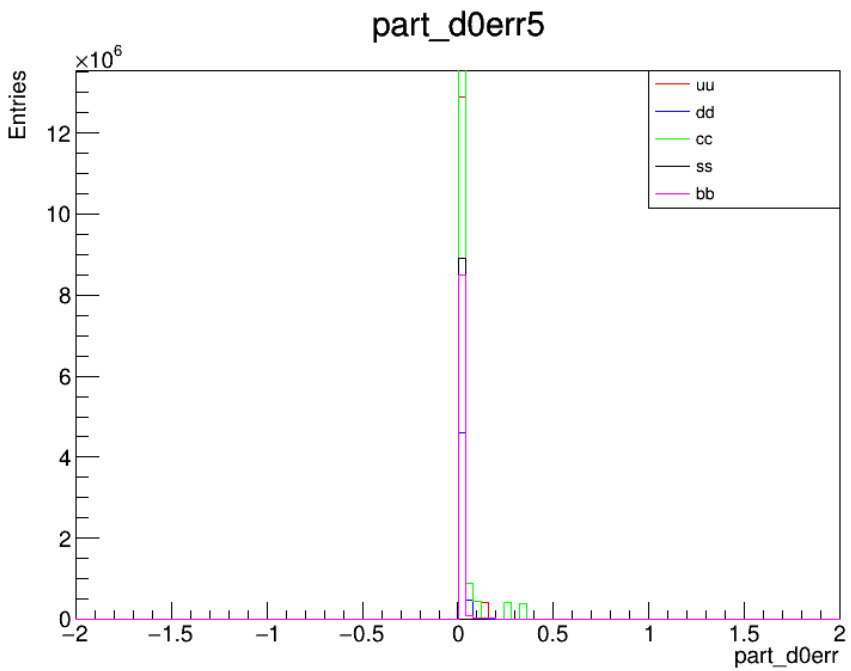
−3
−2
−1
0
1
2
3
4
5
part_isChargedKaon
uu
dd
cc
ss
bb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4
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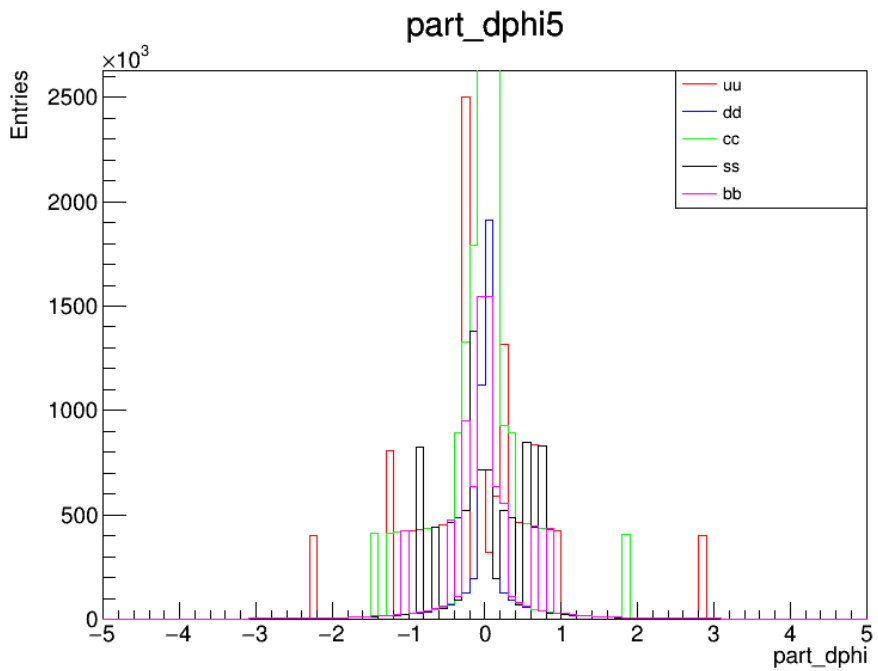
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−1
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2
3
4
5
part_dphi
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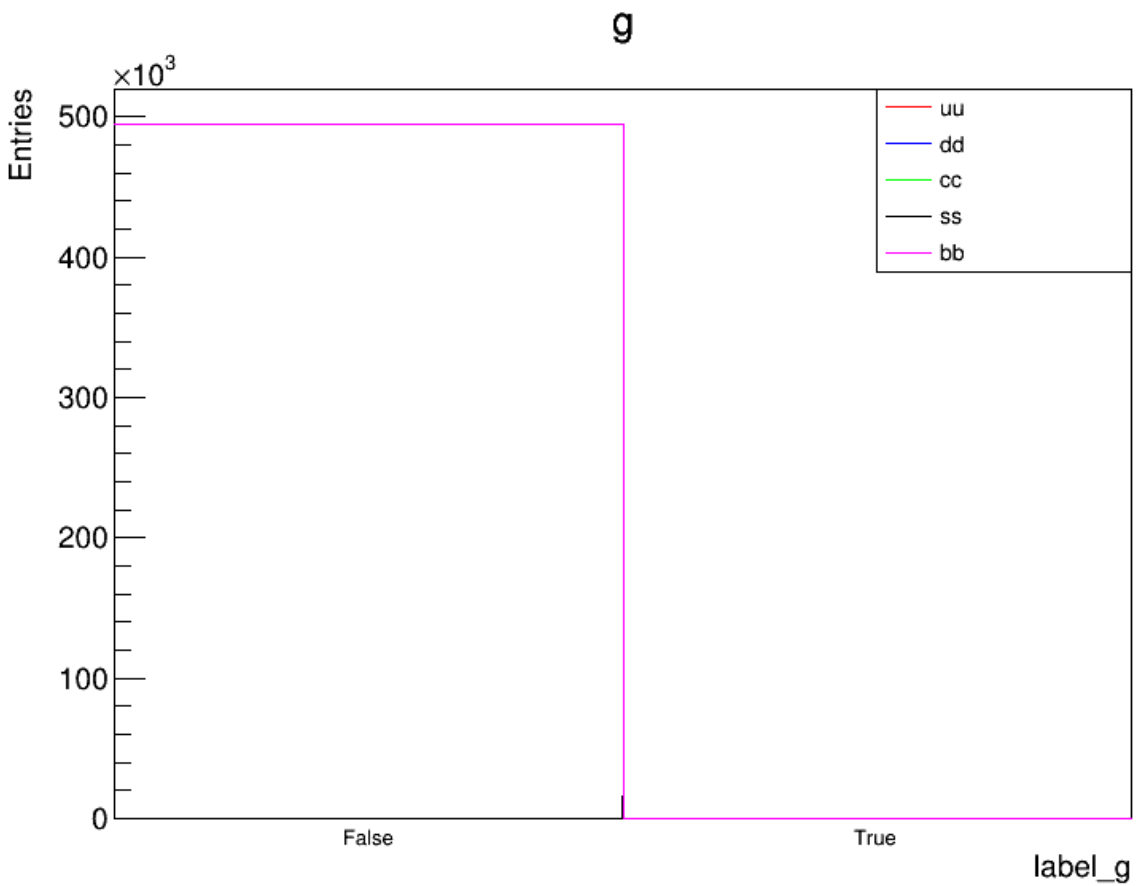
bb


g
×10^3
Entries
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label_g
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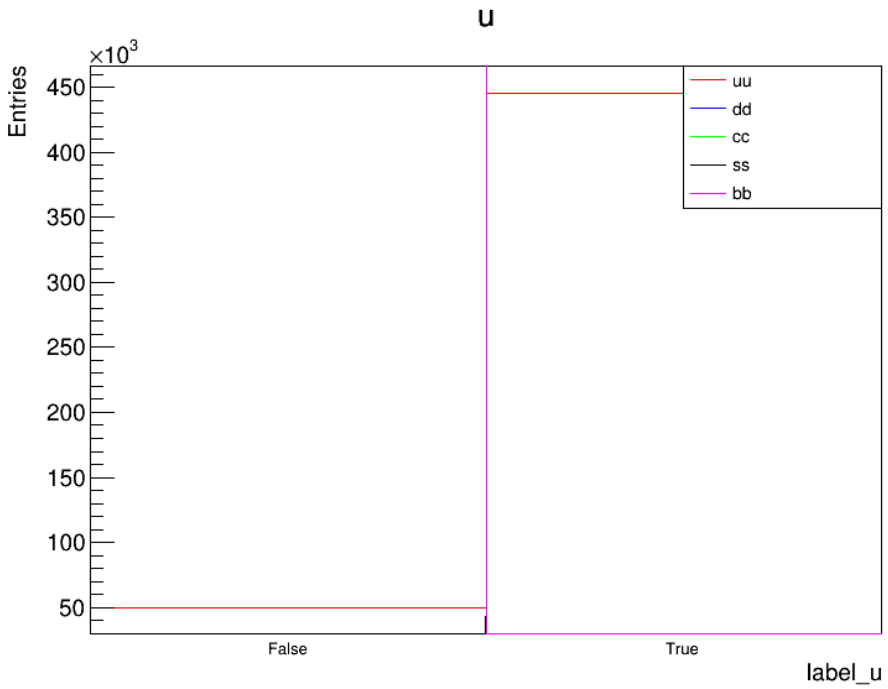
dd
cc
ss
bb


u
Entries
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250
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bb
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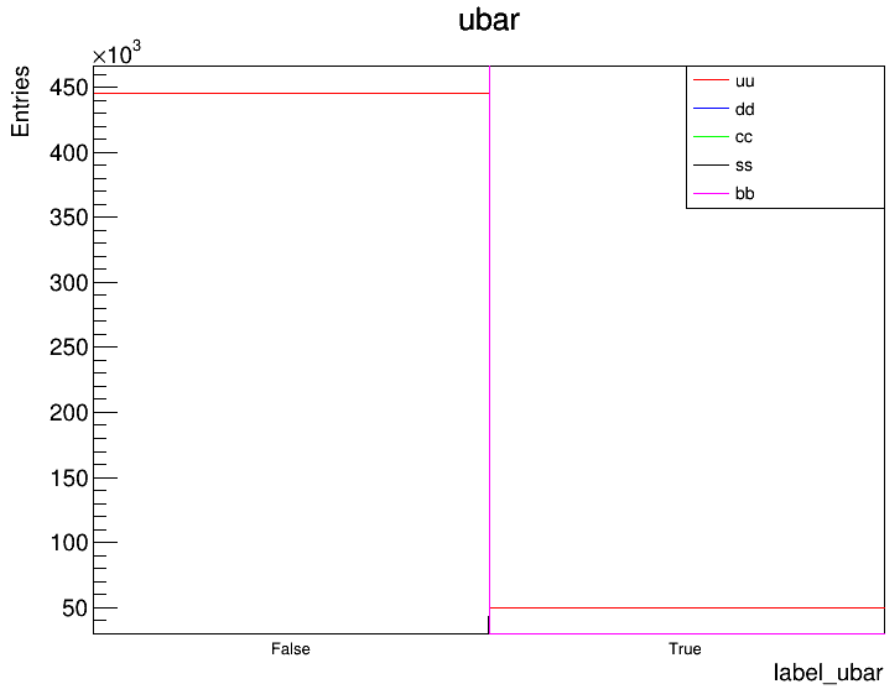
True
label_u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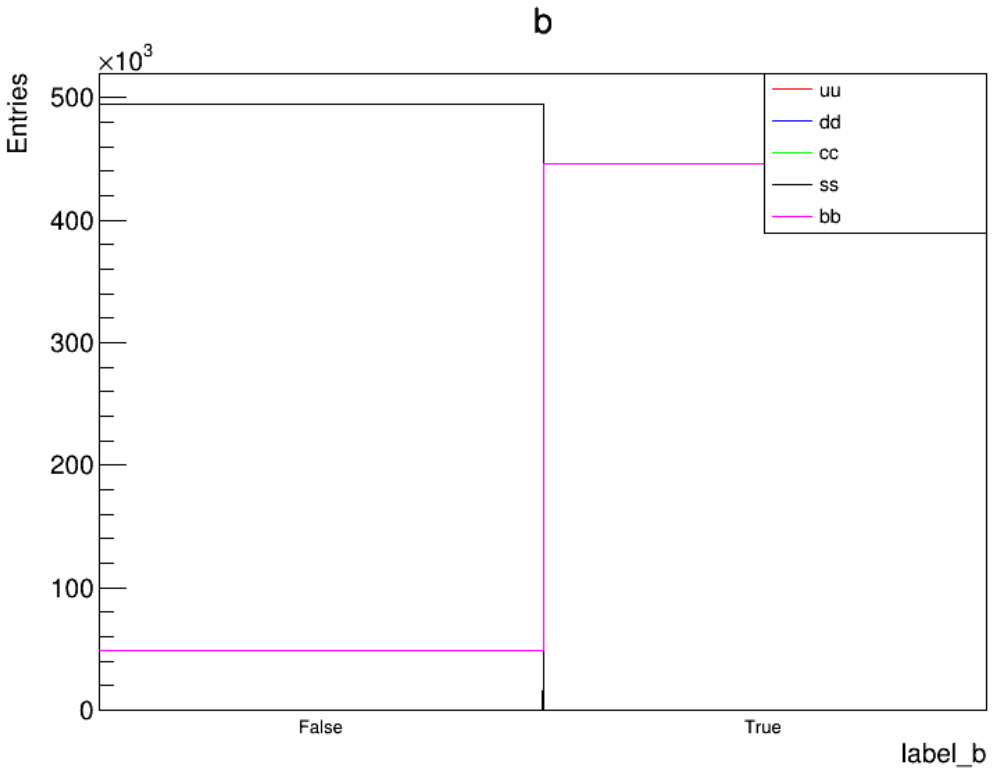
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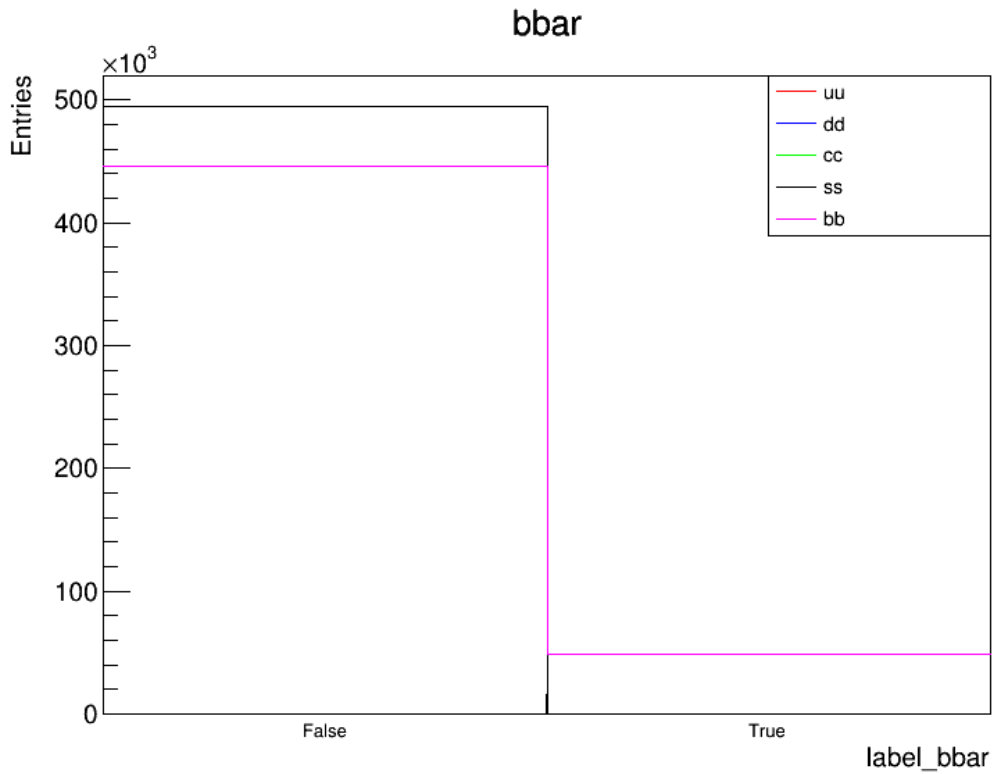
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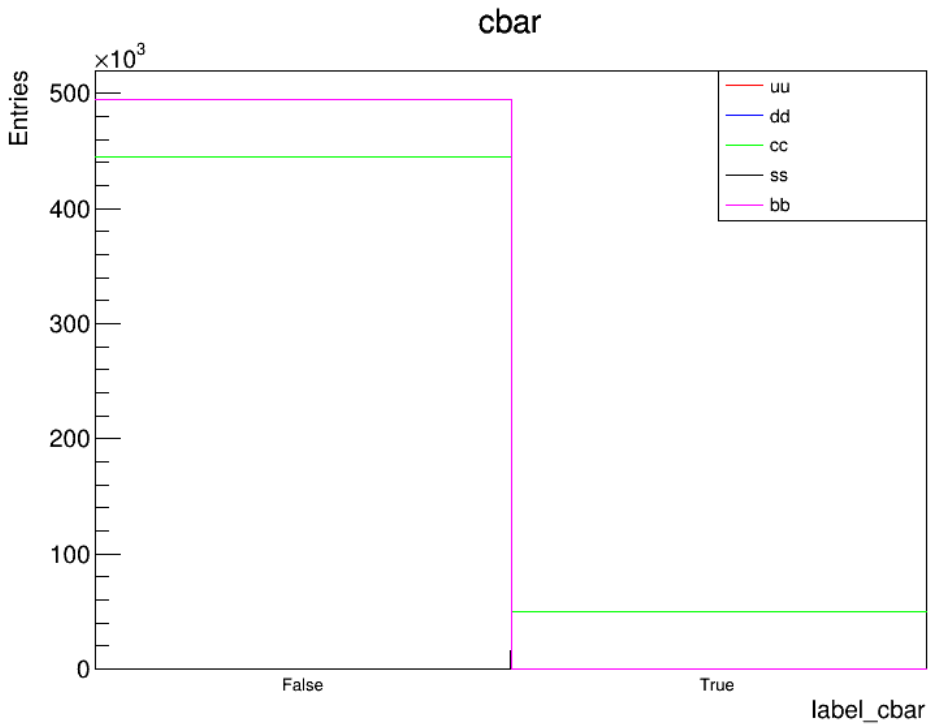
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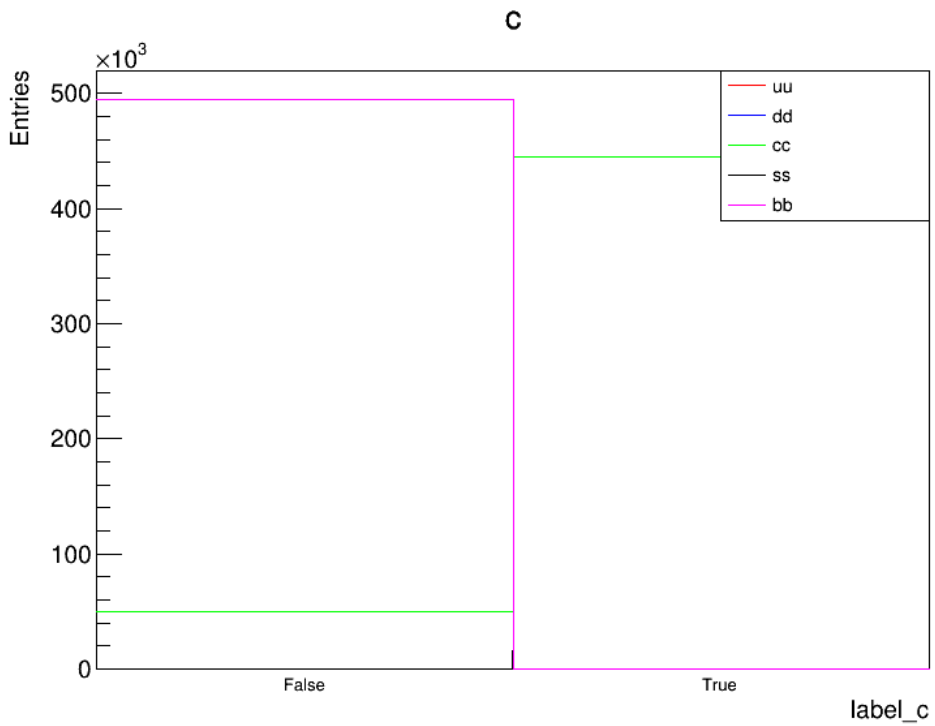
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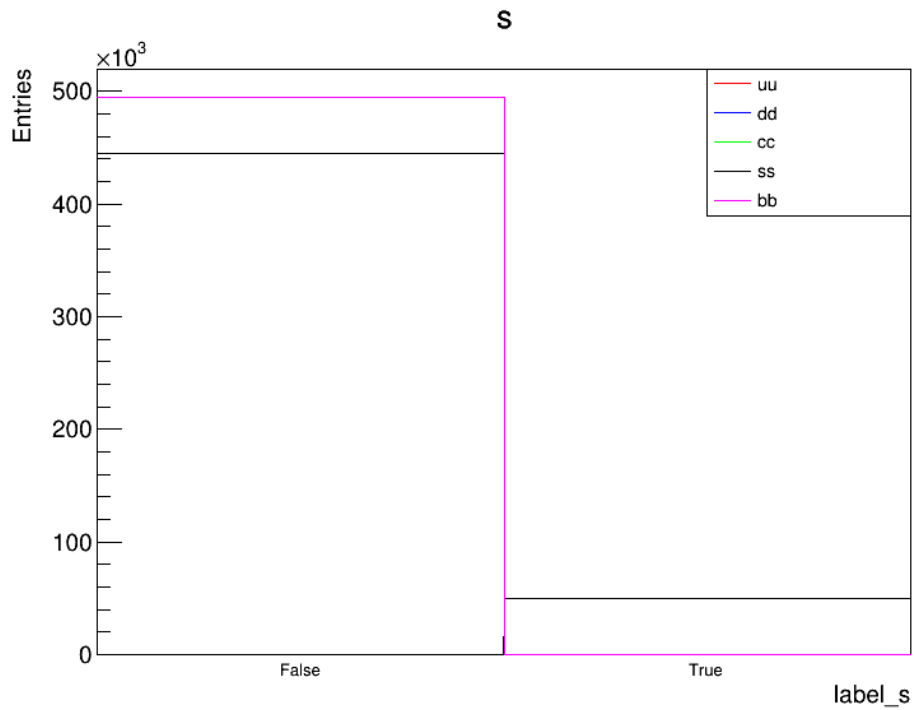
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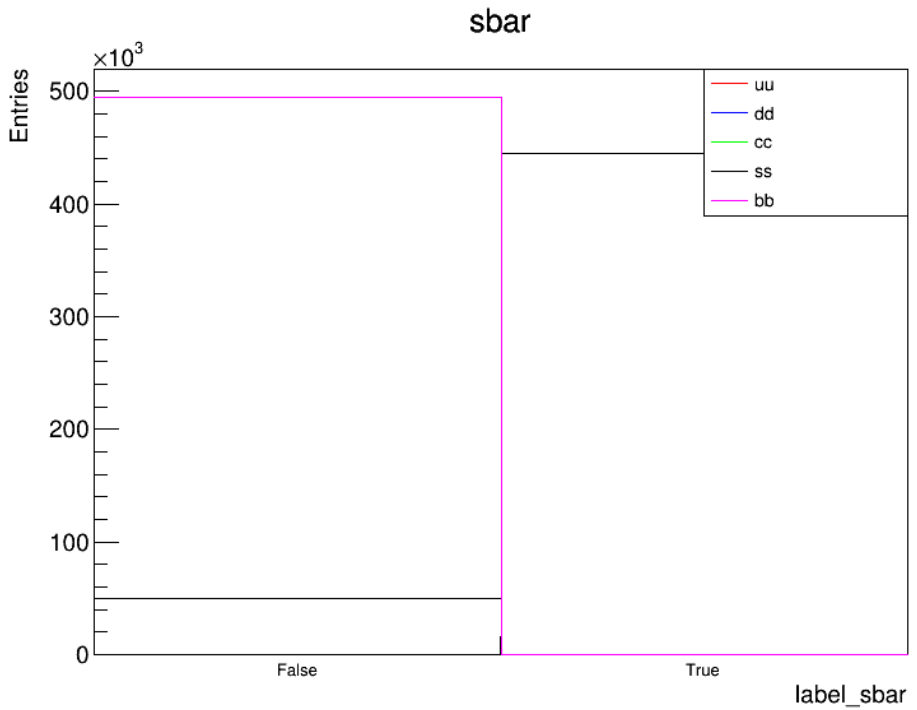
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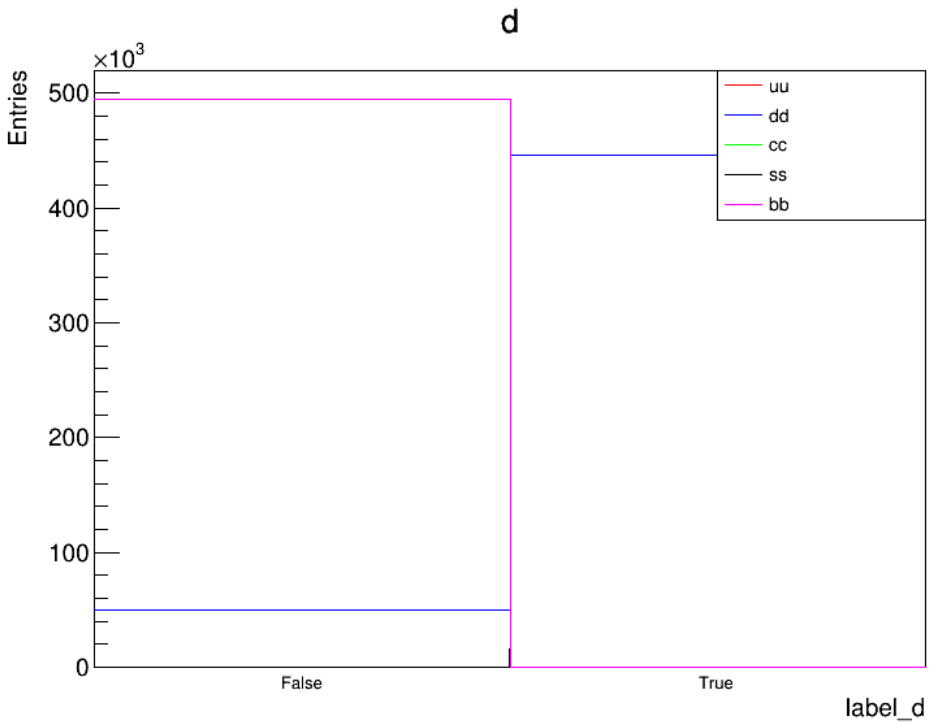
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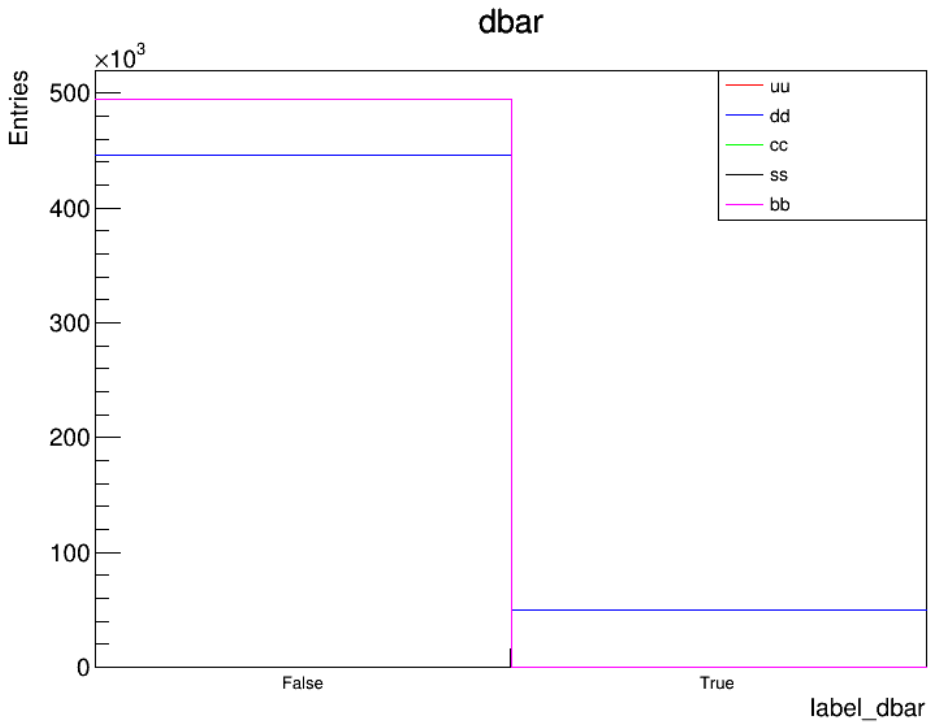
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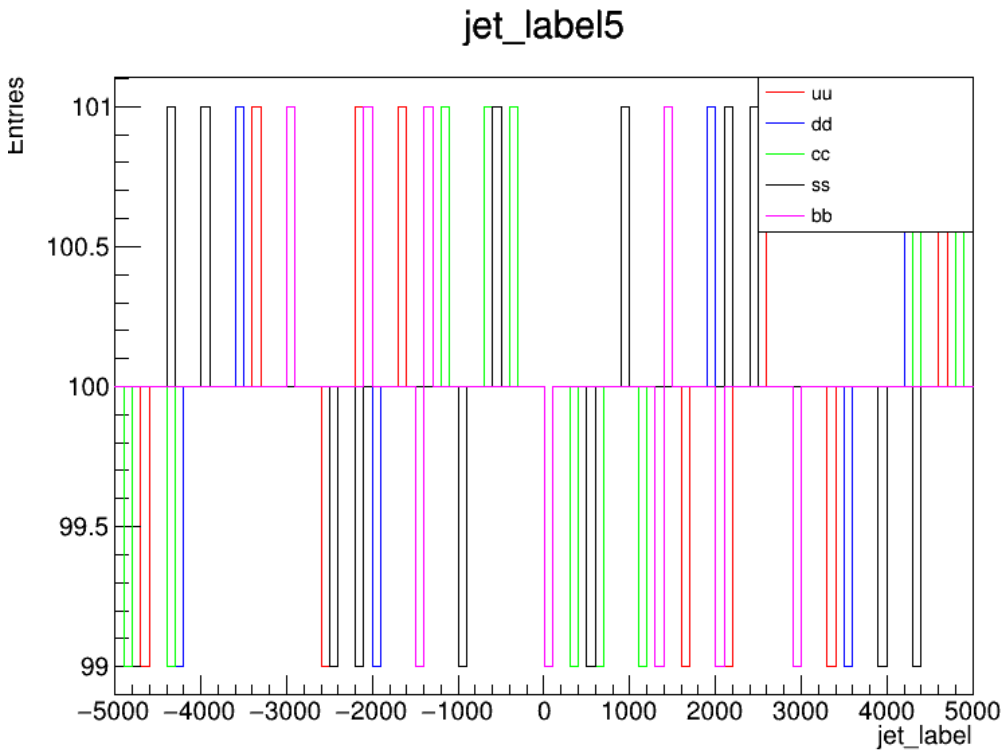
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99
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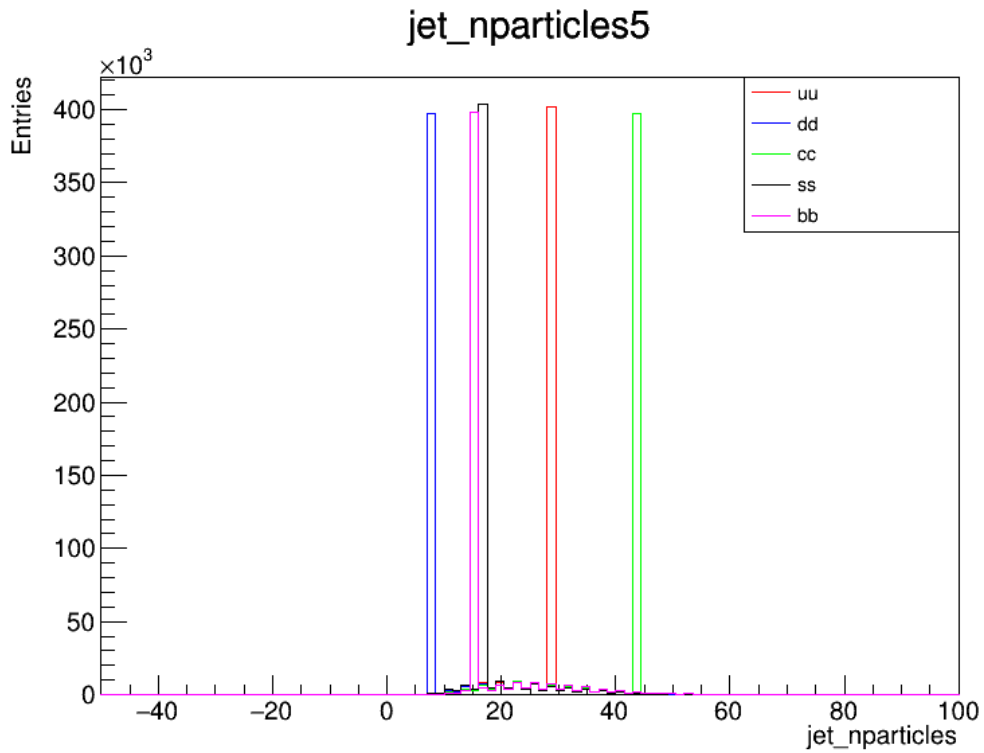
jet_nparticles5
×10^3
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300
250
200
150
100
50
0
−40 −20 0 20 40 60 80 100
jet_nparticles
uu
dd
cc
ss
bb