
ILC physics & software meeting 2026/7/6

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- Jet pairing
 - s-jet pairing
- Generate event
 - Generating $h \rightarrow b\bar{s}$ for 100,000 events

My strategy for jet pairing

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- Get b_{px} , b_{py} , b_{pz} , $bbar_{px}$, $bbar_{py}$, $bbar_{pz}$ (truth quark)
- Get $px1, py1, pz1, px2, py2, pz2$ (reconstructed jet)
- Check at the Jet's vector and the quark's vector, and match those that are pointing in similar directions.

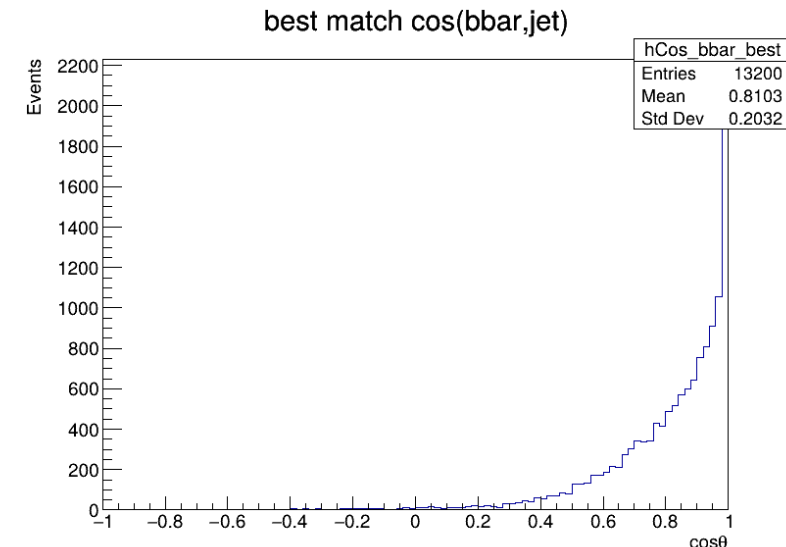
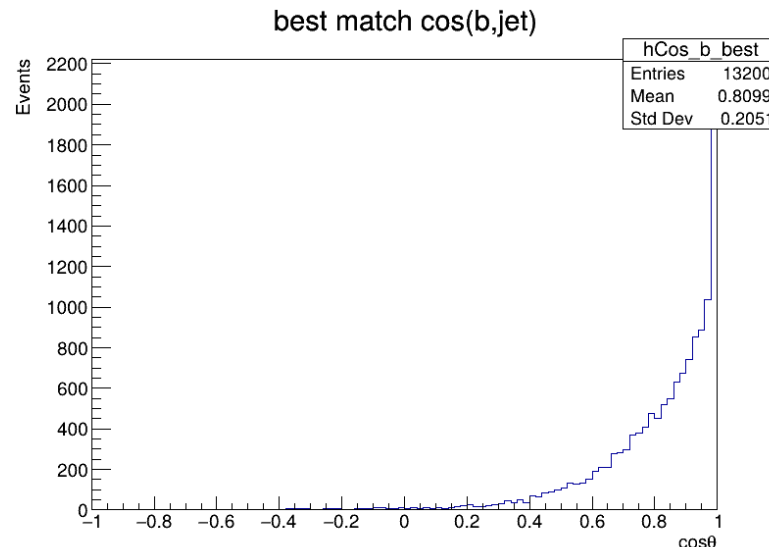
- Compare $\cos(\text{Jet0}-b) + \cos(\text{jet1}-bbar)$ & $\cos(\text{Jet1}-b) + \cos(\text{jet0}-bbar)$

➡ Select the combination with the highest value

$\cos \theta = 1$ Same

$\cos \theta = -1$ Opposite

It's mostly 1,
but some is near 0.



Jet pairing

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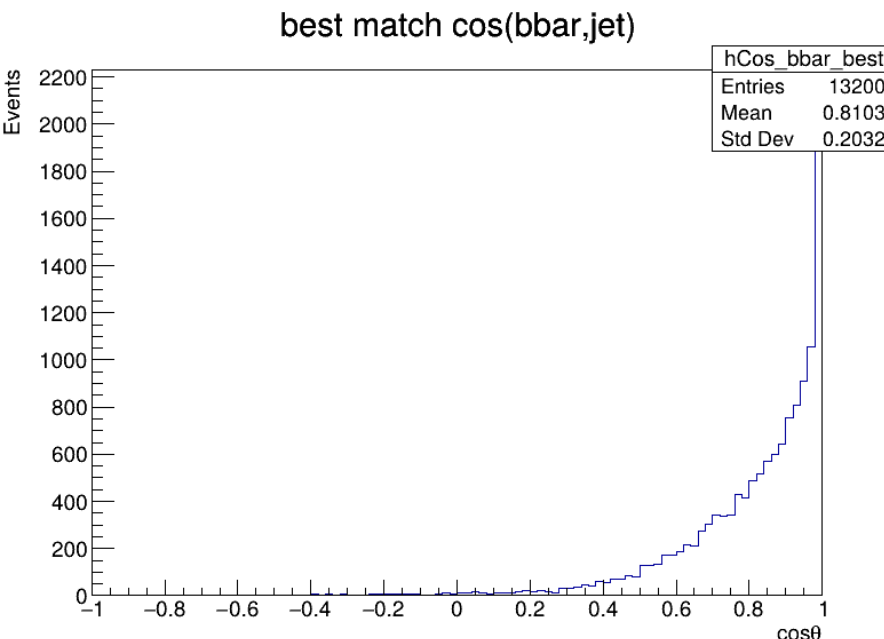
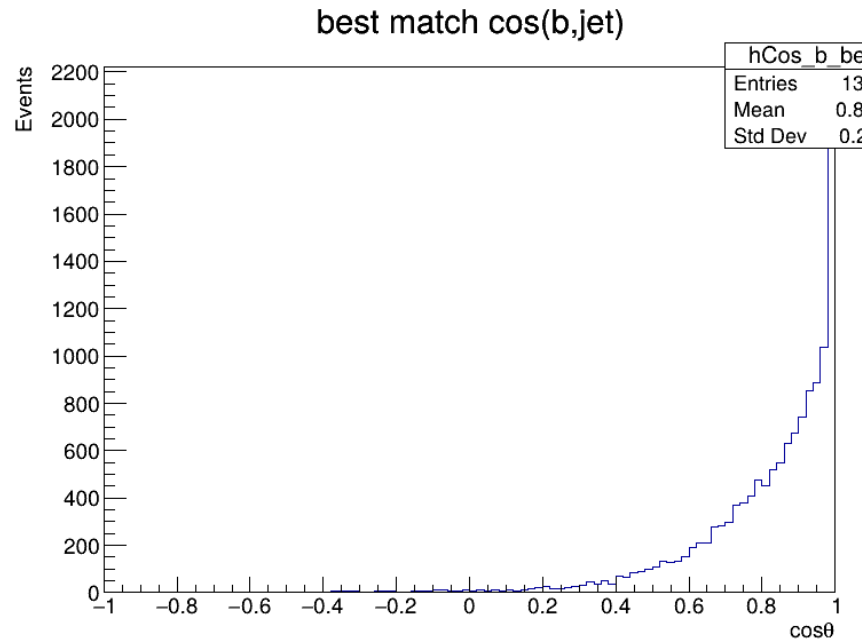
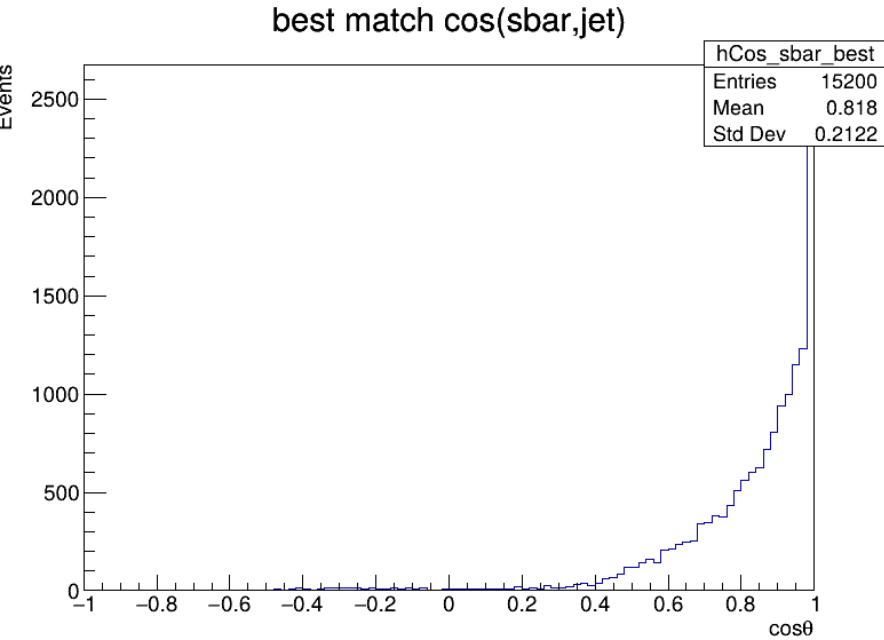
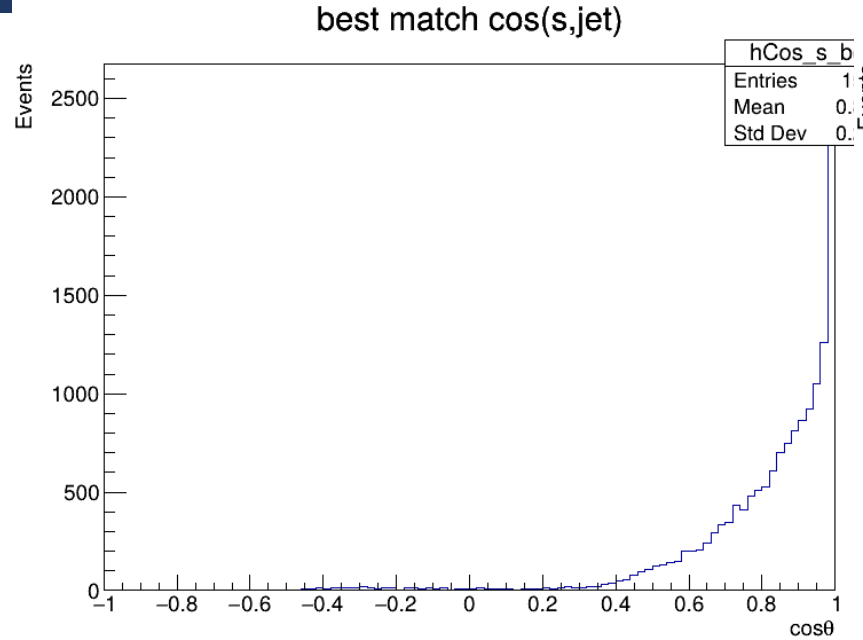
$H \rightarrow ss/Z \rightarrow \mu\mu$

Separate
PDG = 3 & -3
for s-jet

ss

Is it slightly
closer to 0 than
when it was b?
It's almost the
same...

bb

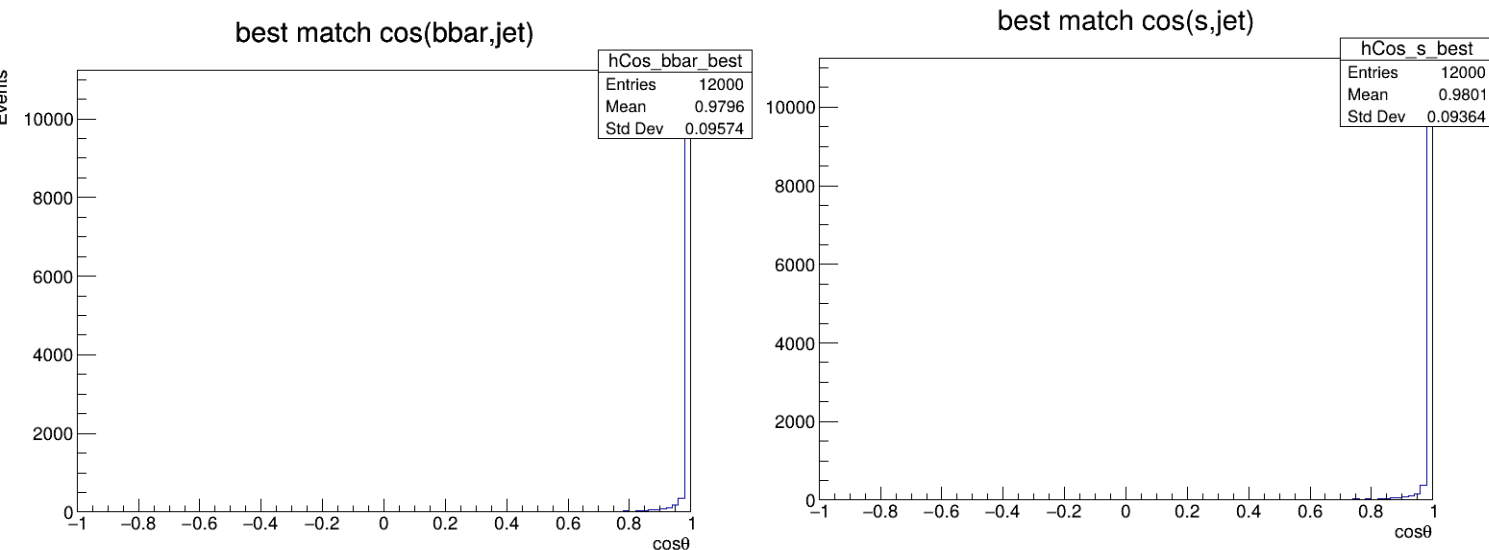


For both bsbar and bbars: (H→bs/Z→ $\nu \nu$)

Generate 100,000 events through the following :

Generate event → detector simulation → Marlinreco → Hilevelreco

➡ Verify using JetClustering, etc.



Is it correct that this results in very good separation?

The cause?

- Is it the difference between $Z \rightarrow \mu$ and $Z \rightarrow \nu$?
- Does it include pileup or not?
→ try to check

H→bb/ss

- “Reconstruct jet” uses jet information from the after the detector simulation.
- Include overlay(pile-up)? ➡ check

H→bs

- Pile-up is not large at ILC? → not large, but not negligible (depends on energy)
- Include ISR?
- $\sqrt{s} = 250\text{GeV}$
- Check reconstruct Z mass, used for pre-selection