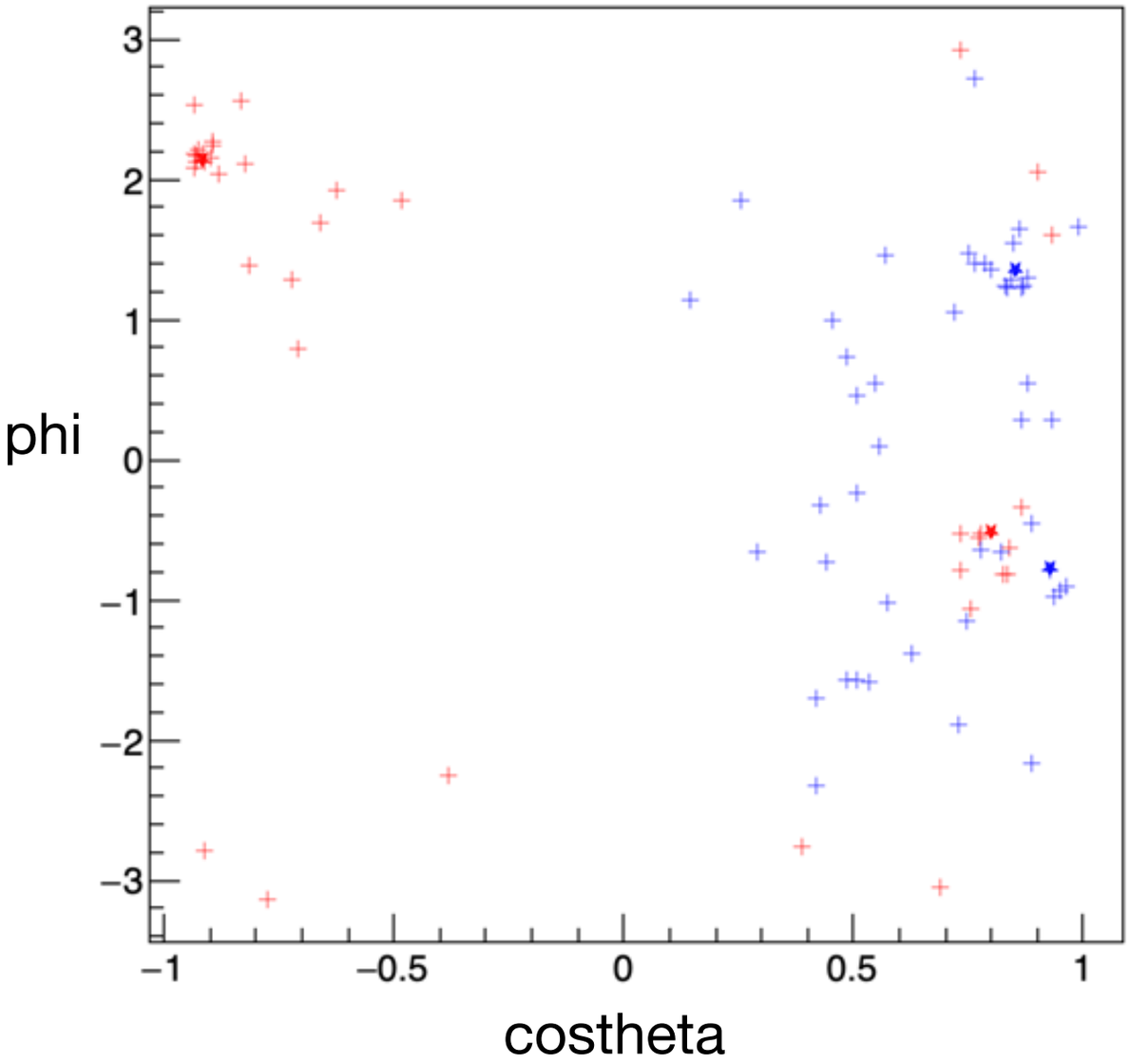
WW/ZZ to 4 quarks

Group these four quarks/jets to two groups, each has two quarks.

Long ago, we randomly grouping them and select the best grouping.

Now, we want to find a more efficient way to group them.

We phot the distribution of (costheta, phi) of each final state particle and the original quarks.

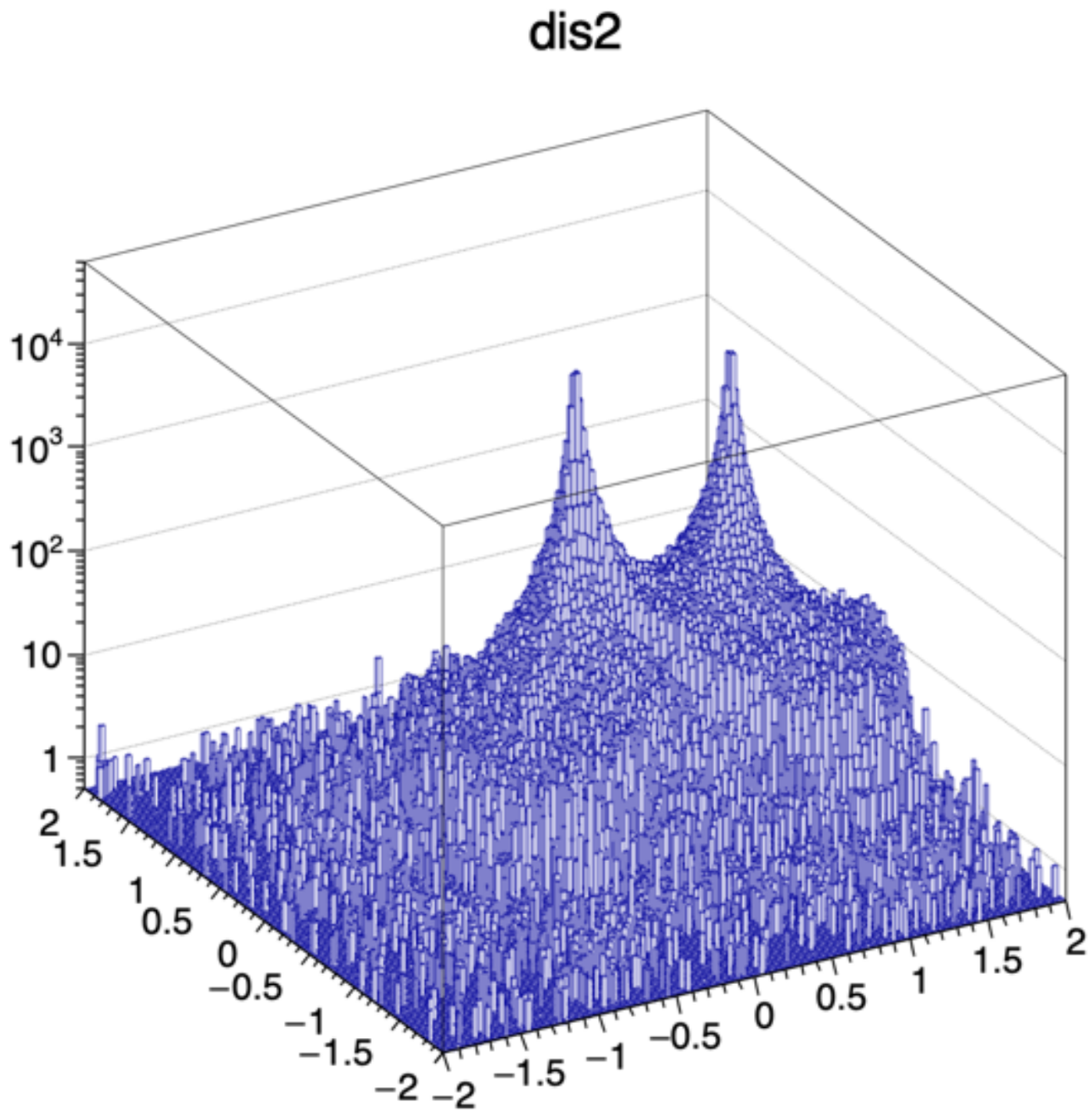


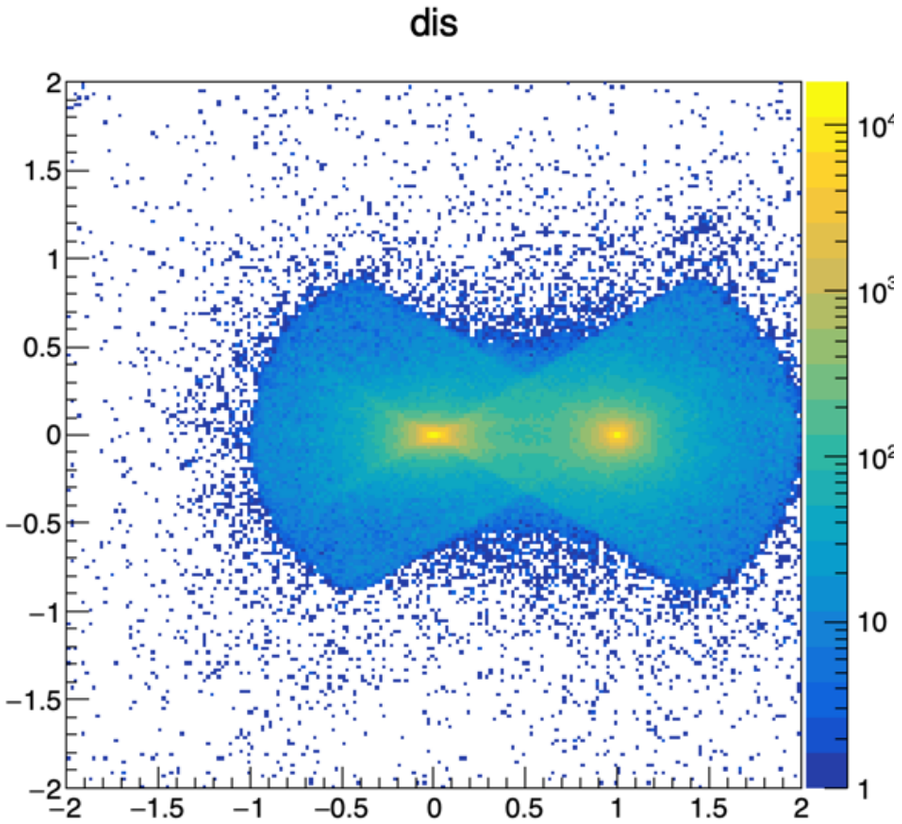
Just like left graph, one W boson decay to two quarks (red star) and these two quarks further decay to lots of final state particles (red +), the other W boson decay to two quarks (blue star) and further decay to lots of final state particles (blue +).

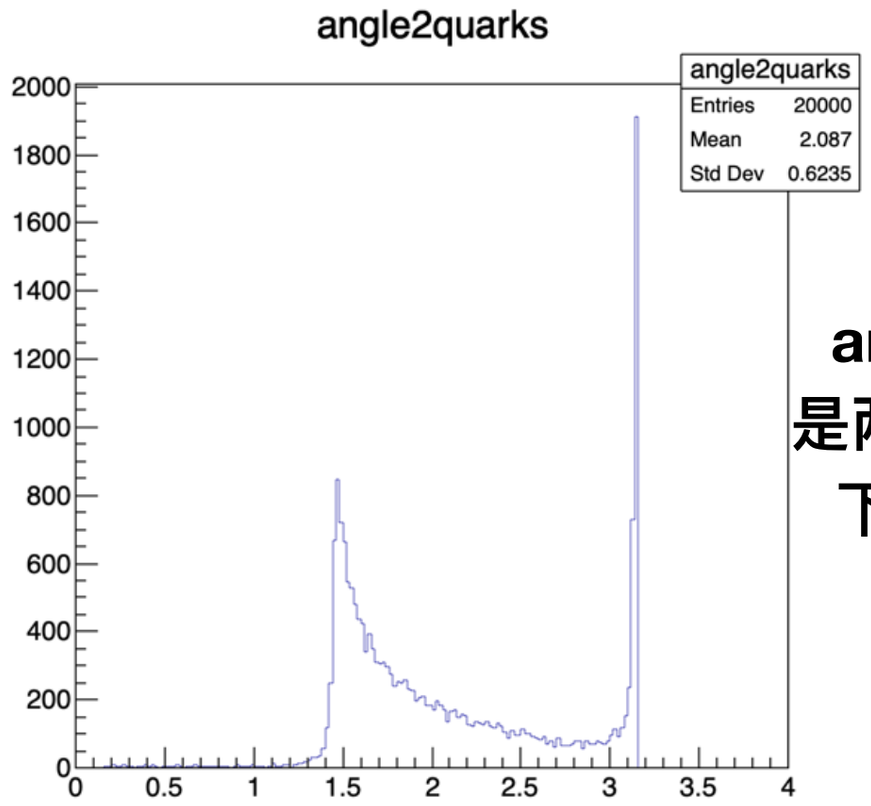
We know the final state particles decayed from the same quark would locate close to this quark, so there are four clusters idealy.

We want to know whether there are some links between two final state particle clusters, which decayed from the same boson.

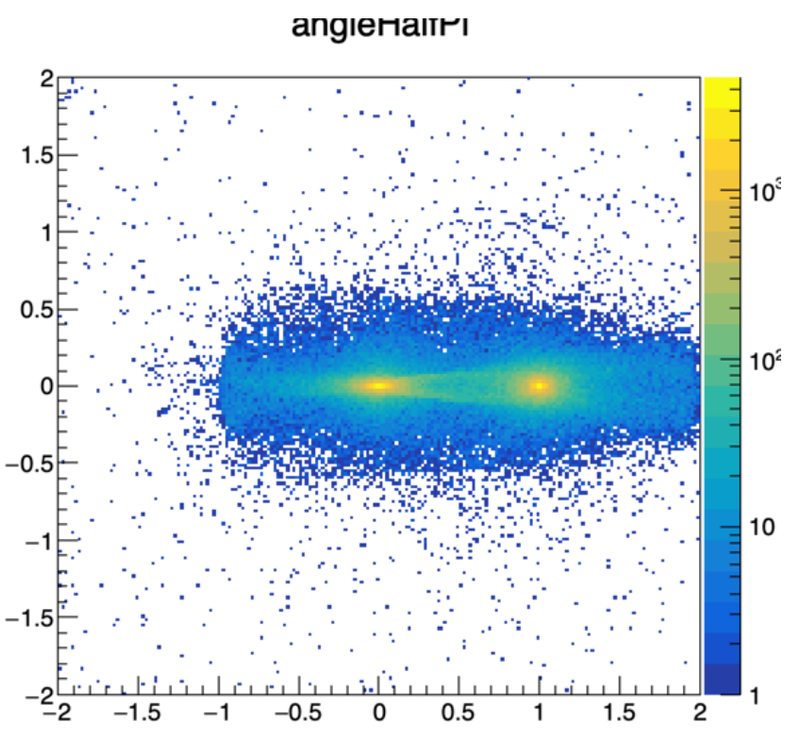
ISR return(240GeV to 2 quarks)

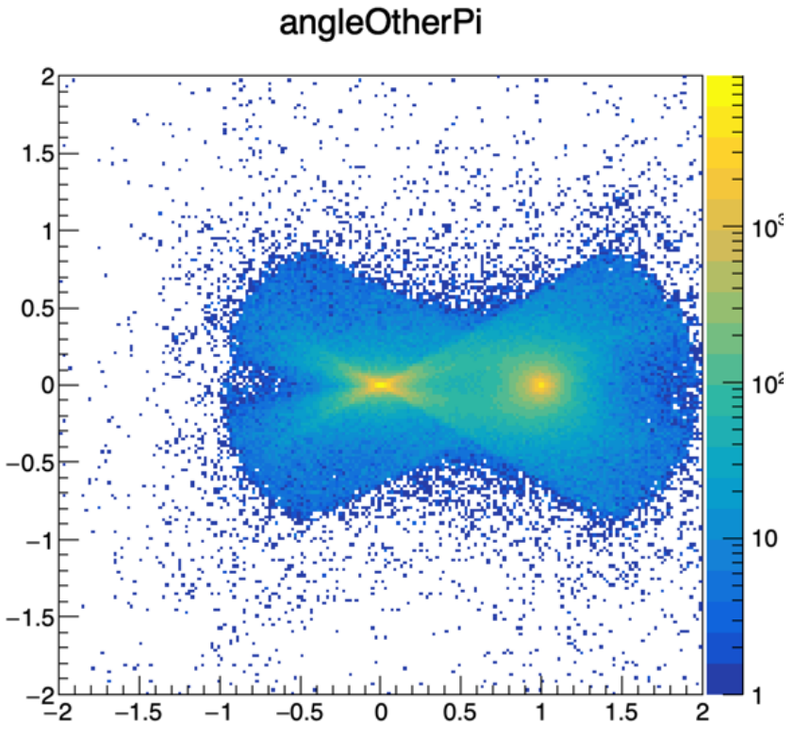


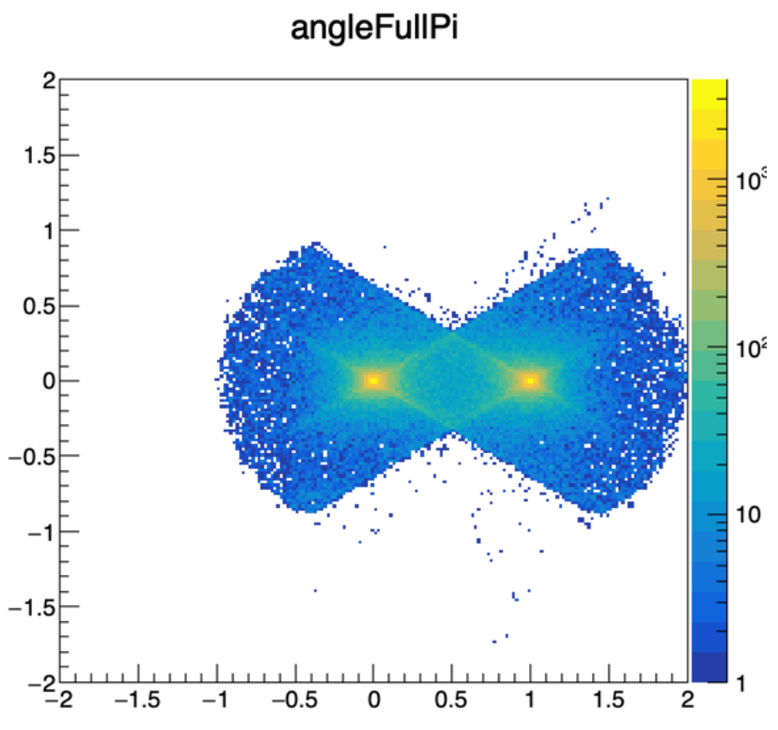




angle2quarks这张图画是两个quark的夹角分布。下面三张图是取出 夹角在某个范围内的粒子





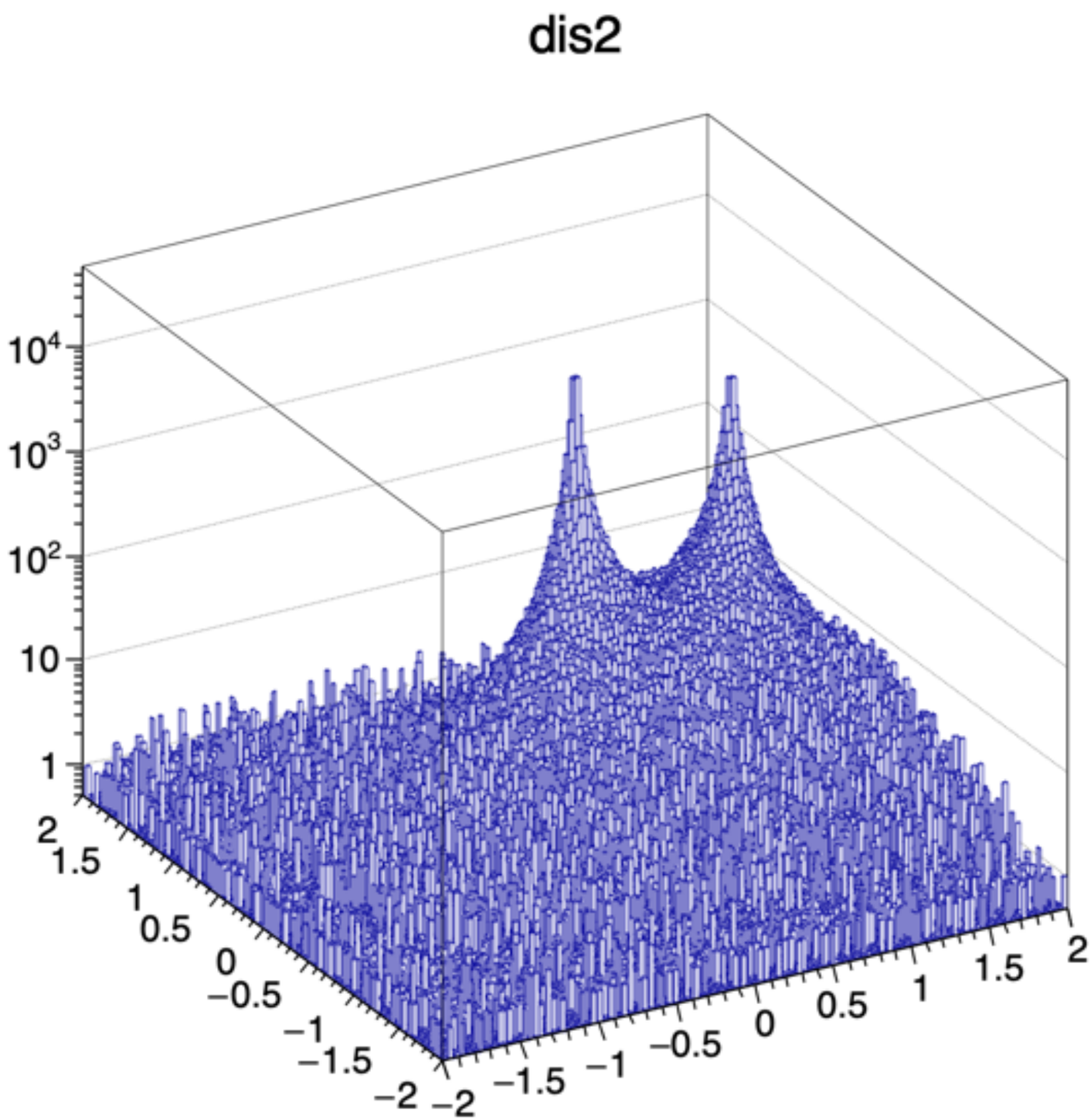


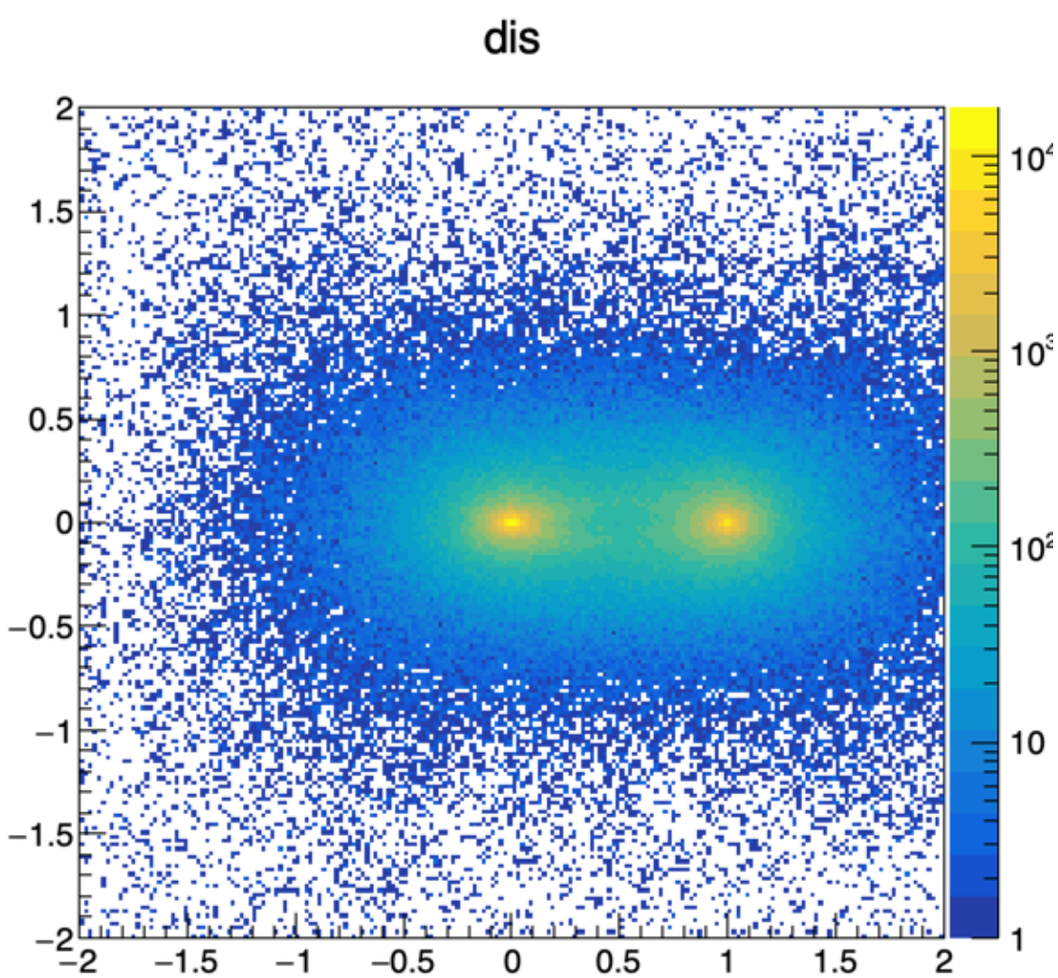
1.4 < angle < 1.6

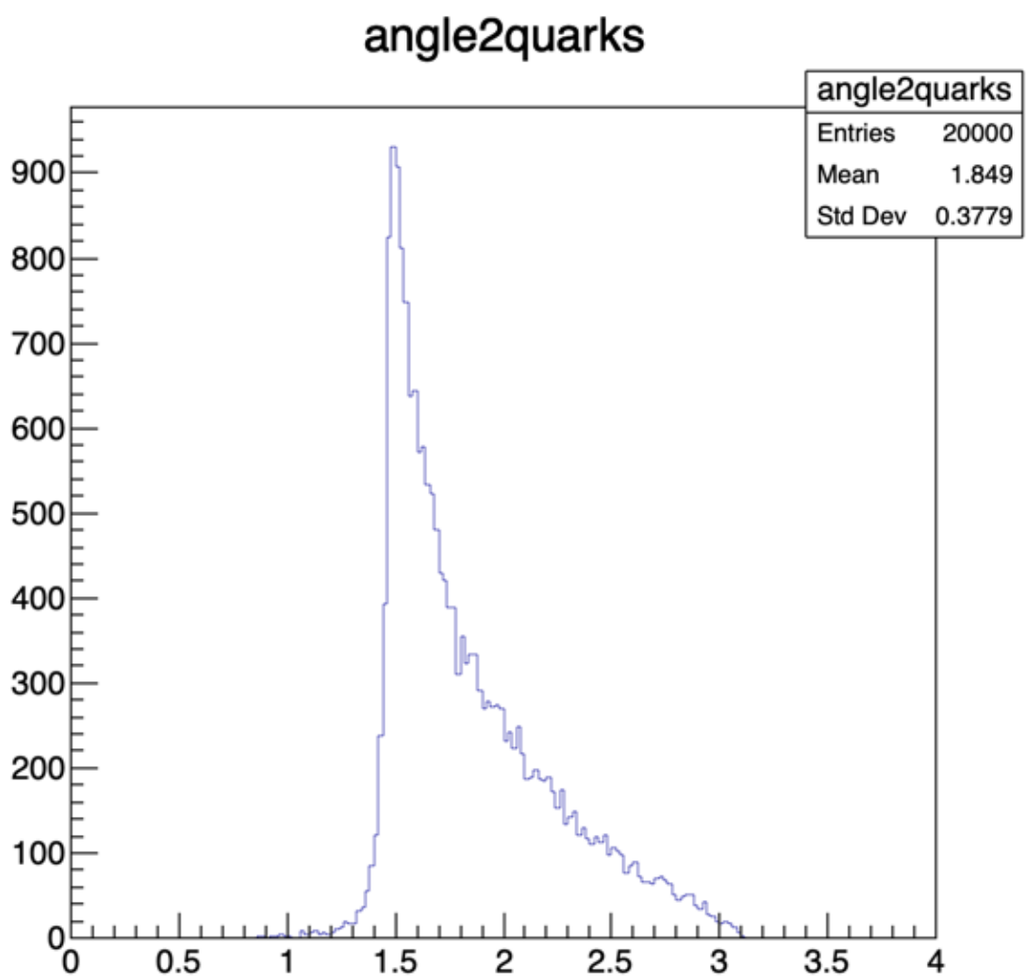
1.6 <= angle <= 3

angle > 3

WW semi-leptonic

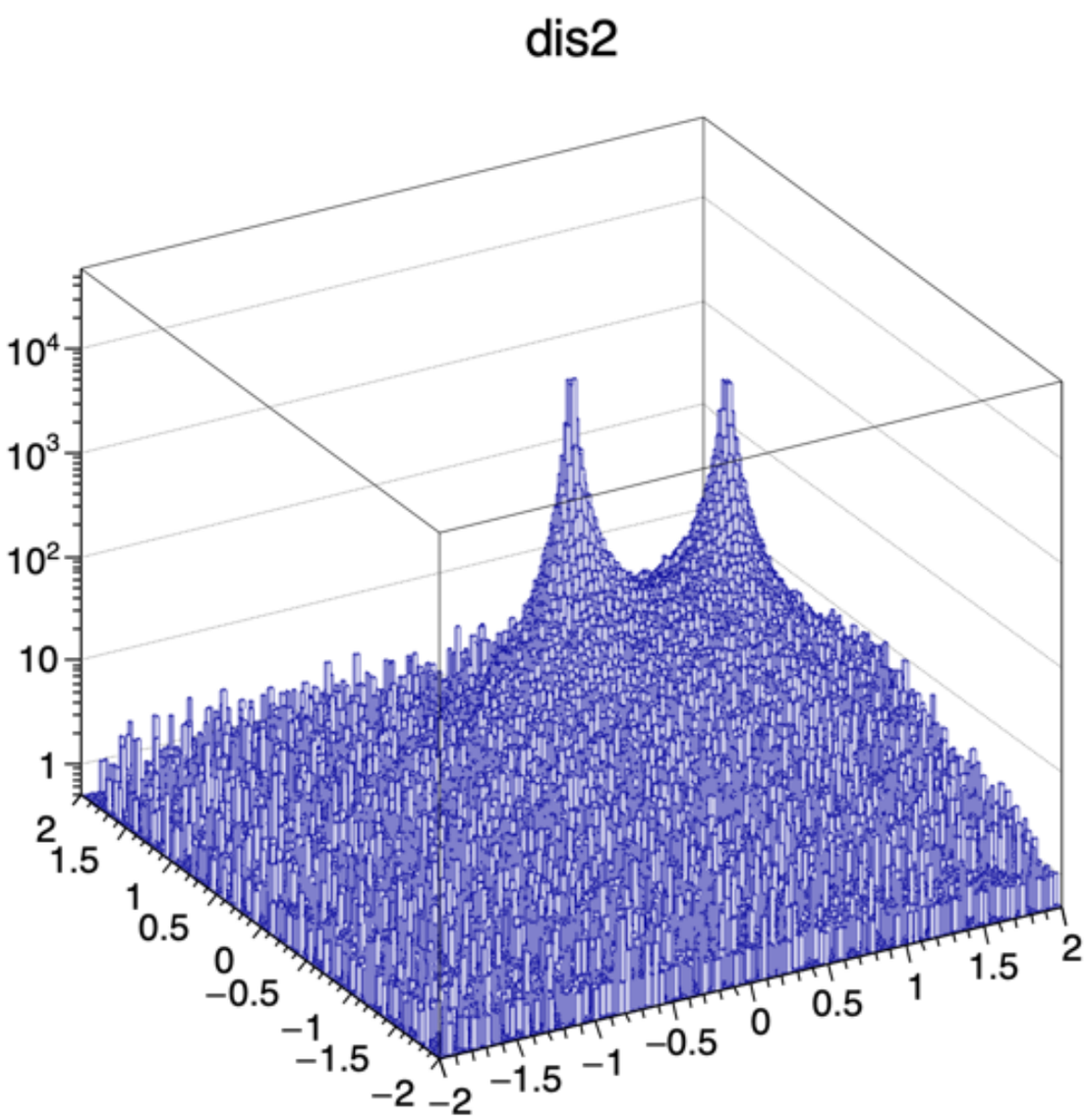


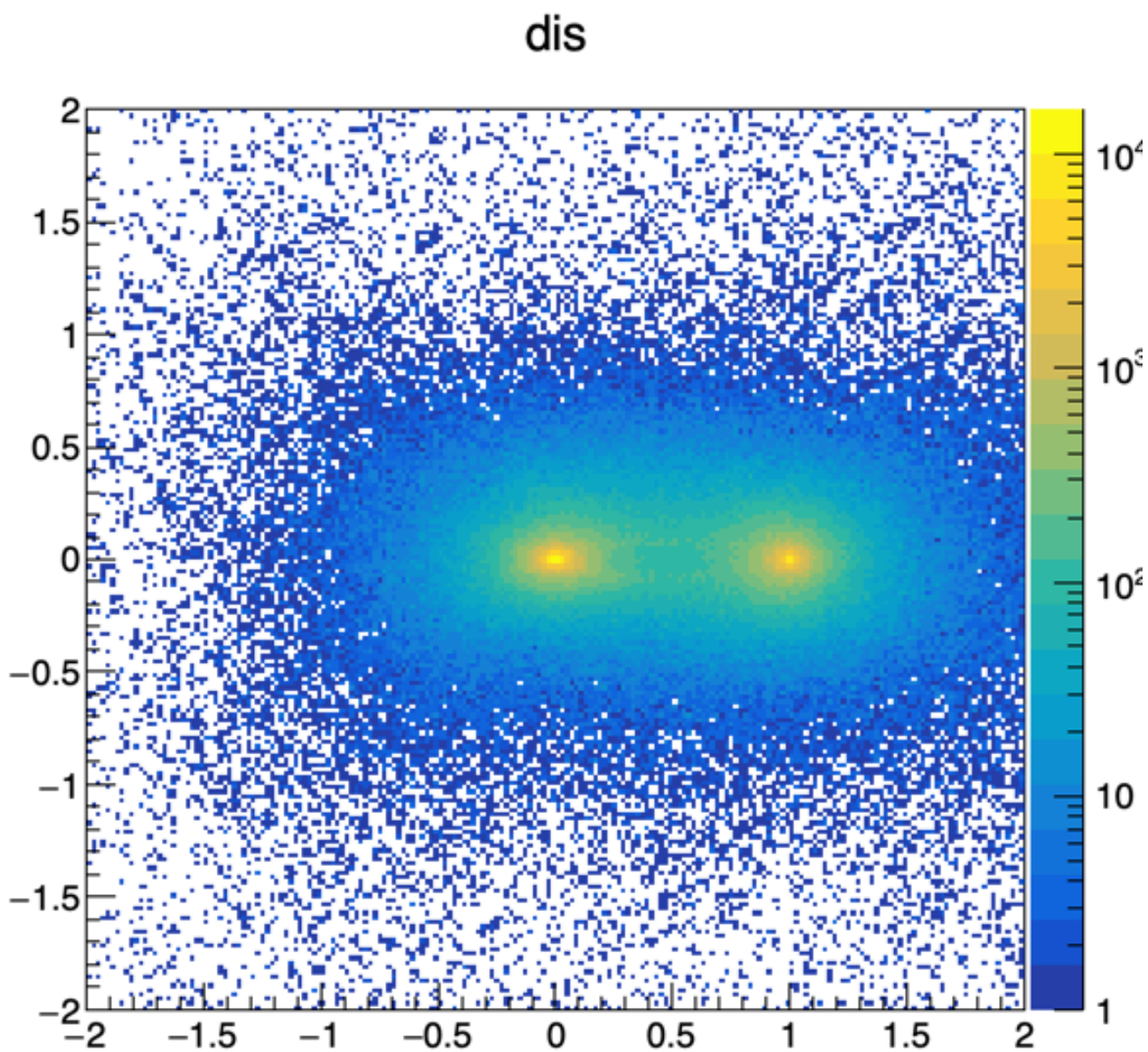

dis
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
10
1


angle2quarks
angle2quarks
Entries 20000
Mean 1.849
Std Dev 0.3779
900
800
700
600
500
400
300
200
100
0
0
0.5
1
1.5
2
2.5
3
3.5
4

WW to 4 quarks

从W出来的末态粒子投到此W出来的两个quark 的方向





从此W出来的末态粒子投到彼W出来的quark的方向