Update for Belle data and generic MC

Belle Data (all experiments)

Generic MC (3.0 streams)

25 Jan. 2024

Last meeting comments

- Distributions for

  1- Different m_hadROE ranges

  2- m_J/Psi cut

- Normalized to number of events in data (Not done yet).

Cuts in the reconstruction program

- MVA photon cuts

- $1.6 < m_{hadROE} < 2.4$ GeV

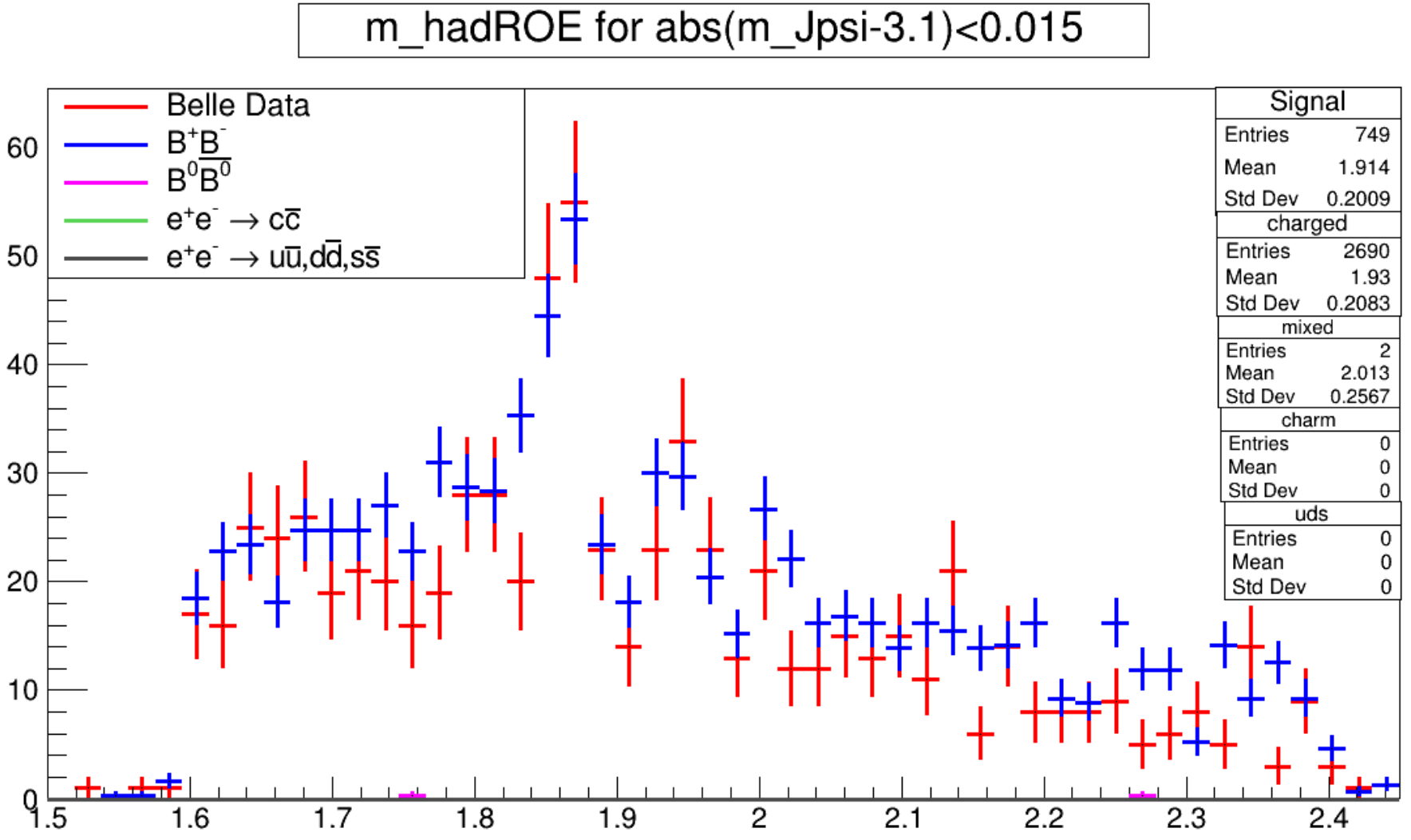
Signal side cuts (root level)

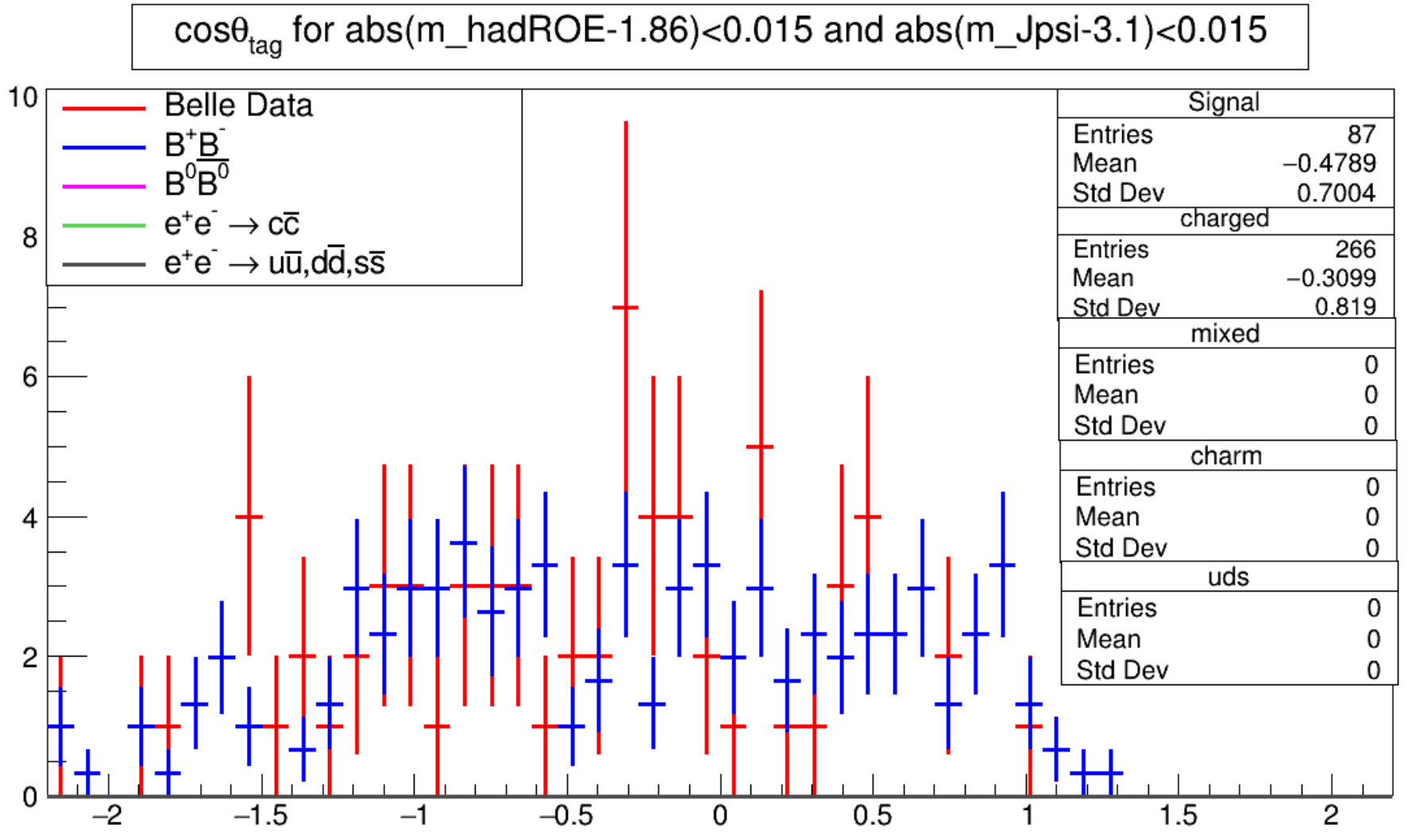
1- $M_{bc} > 5.27$ GeV

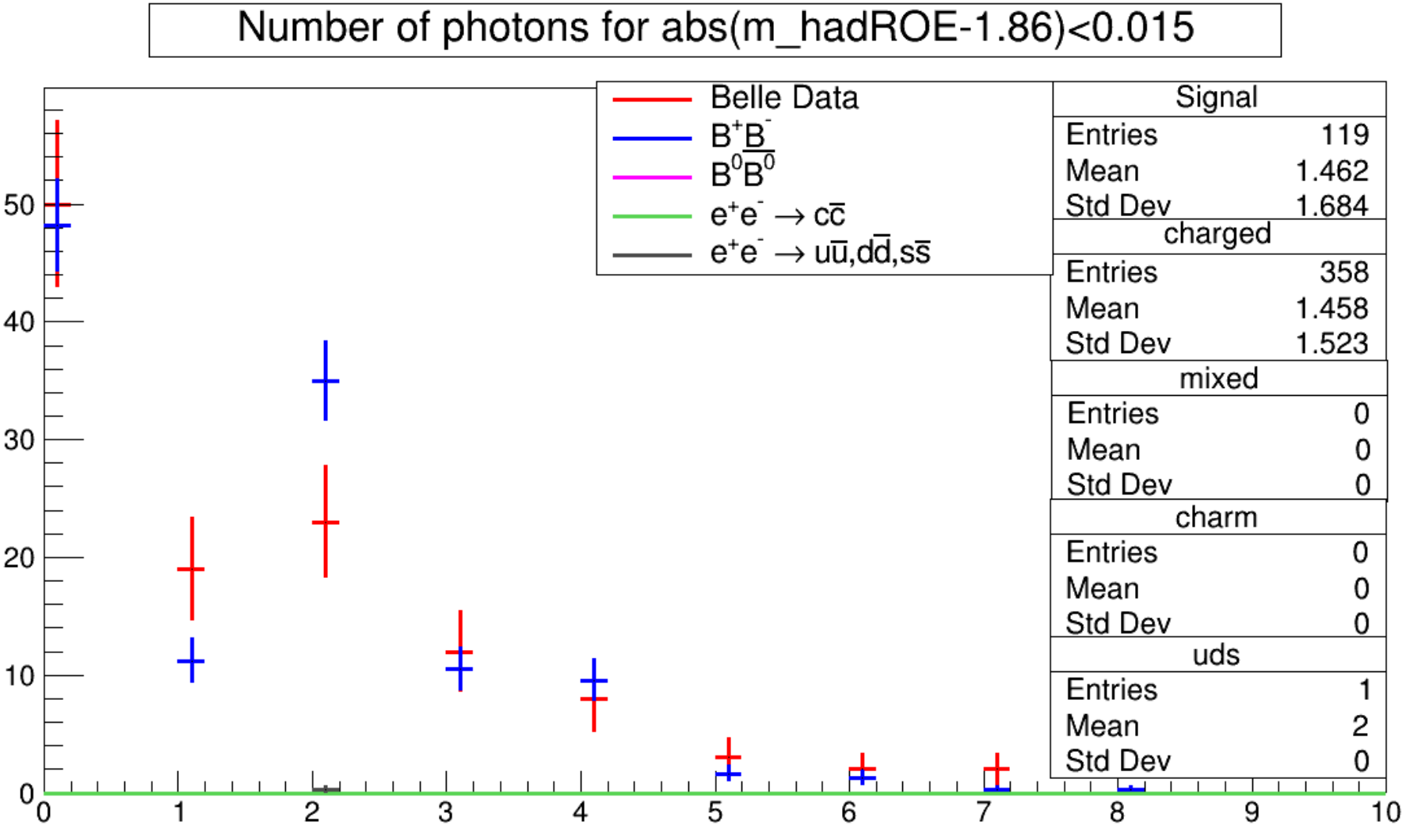
2- $-0.050 < \Delta E\_B_{sig} < 0.050$ GeV

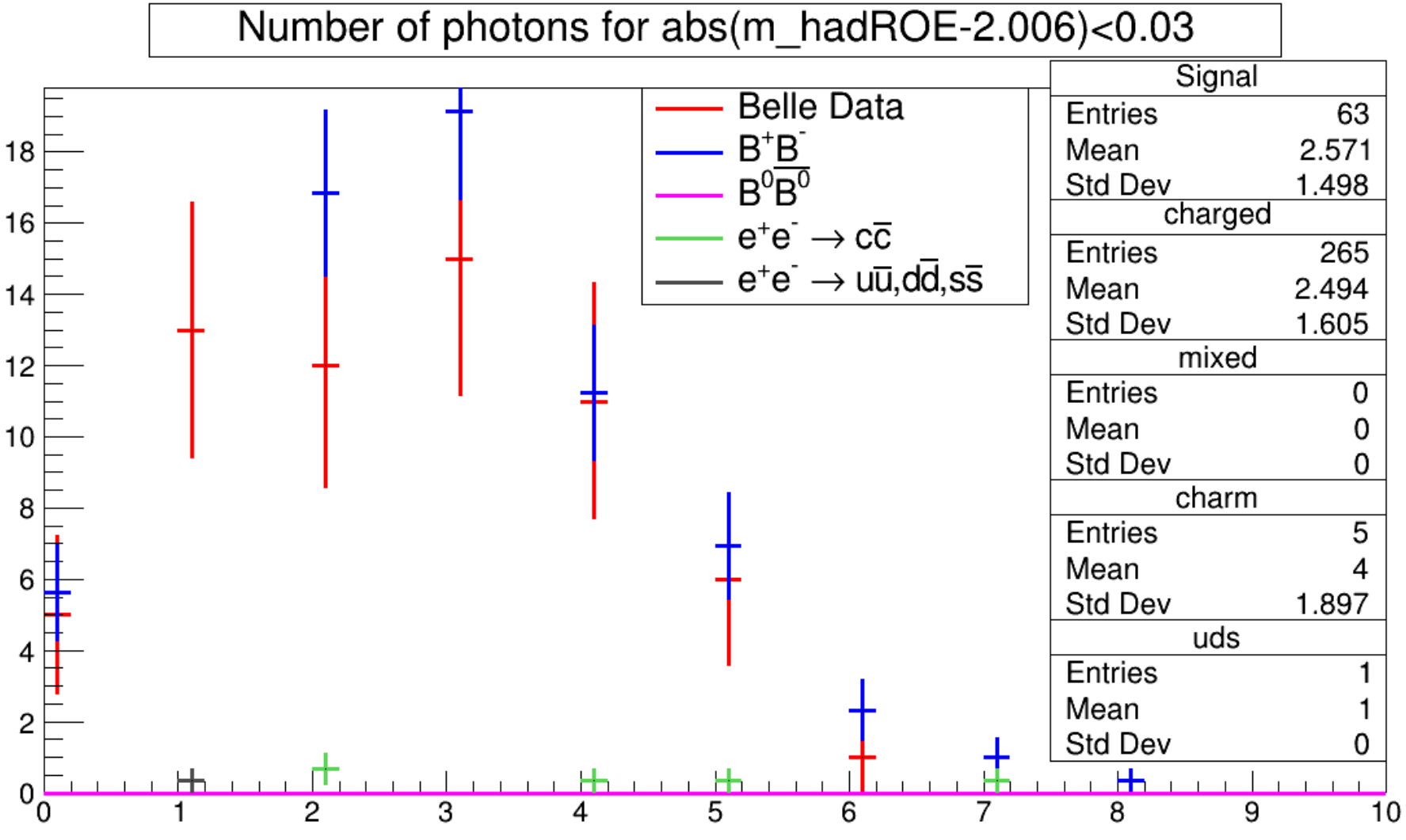
3- Rank 1

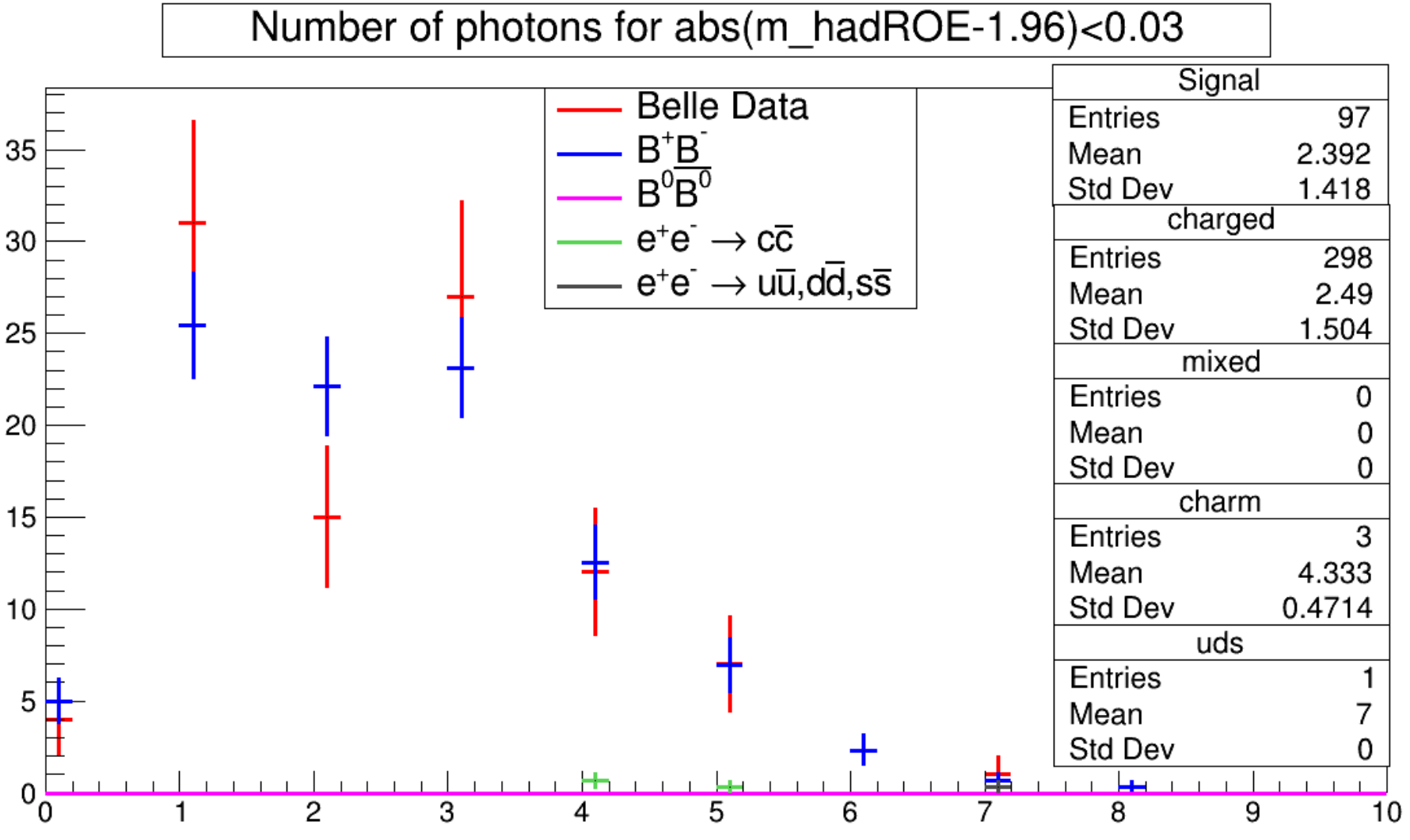
4- If some additional cut is applied, it will be mentioned in the title.

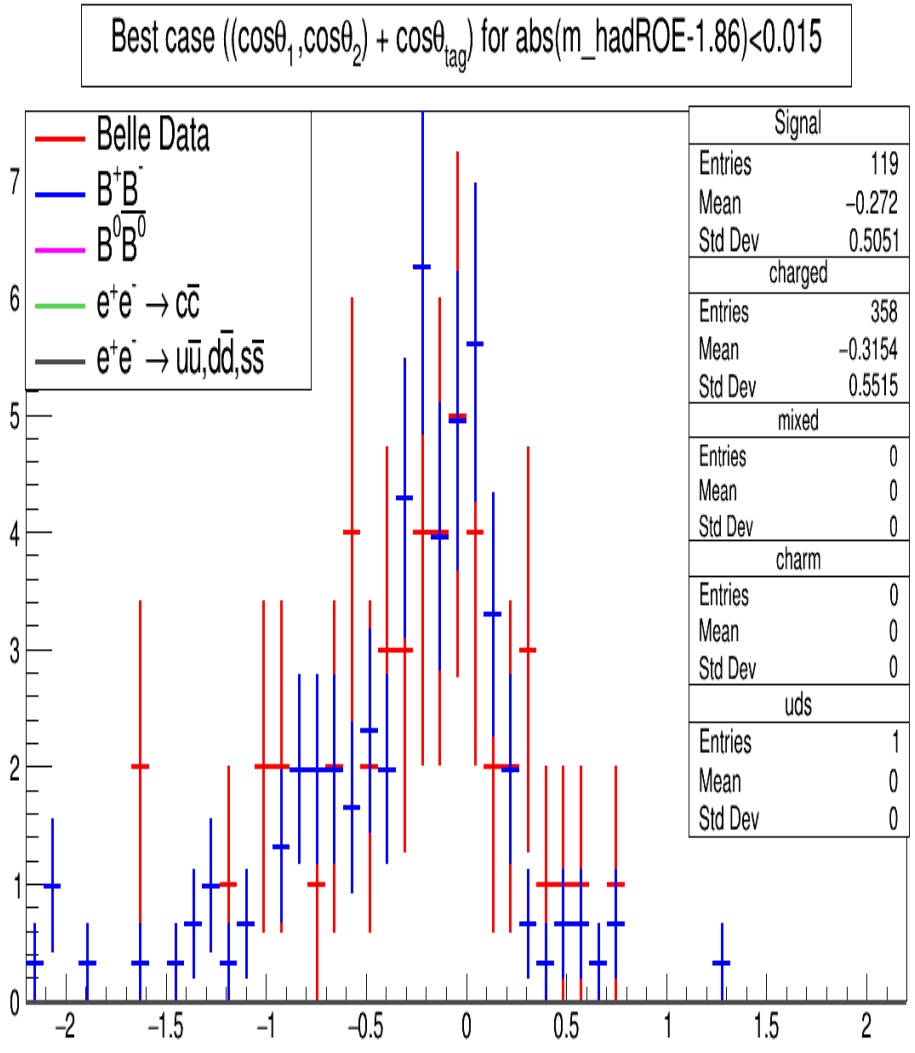

m_hadROE for abs(m_Jpsi-3.1)<0.015
Belle Data
B+B-
B0B0
e+e- → cc̄
e+e- → uū,dd̄,ss̄
Signal
Entries 749
Mean 1.914
Std Dev 0.2009
charged
Entries 2690
Mean 1.93
Std Dev 0.2083
mixed
Entries 2
Mean 2.013
Std Dev 0.2567
charm
Entries 0
Mean 0
Std Dev 0
uds
Entries 0
Mean 0
Std Dev 0
0
10
20
30
40
50
60
1.5
1.6
1.7
1.8
1.9
2
2.1
2.2
2.3
2.4

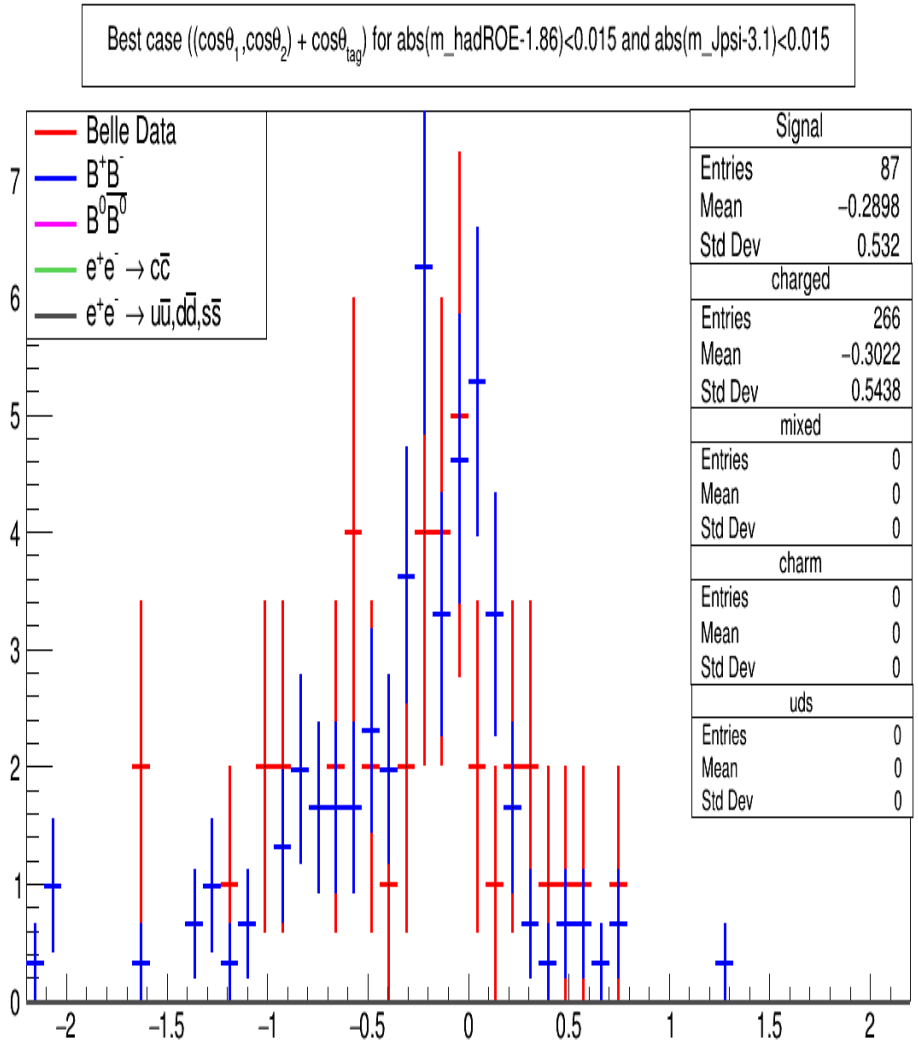

cosθtag for abs(m_hadROE-1.86)<0.015 and abs(m_Jpsi-3.1)<0.015
Belle Data
B+B-
B0B0
e+e- → cc̄
e+e- → uū,dd̄,ss̄
Signal
Entries 87
Mean −0.4789
Std Dev 0.7004
charged
Entries 266
Mean −0.3099
Std Dev 0.819
mixed
Entries 0
Mean 0
Std Dev 0
charm
Entries 0
Mean 0
Std Dev 0
uds
Entries 0
Mean 0
Std Dev 0
10
8
6
4
2
0
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2


Number of photons for abs(m_hadROE-1.86)<0.015
Belle Data
B+B-
B0B0
e+e- → cc̄
e+e- → uū,dd̄,ss̄
Signal
Entries 119
Mean 1.462
Std Dev 1.684
charged
Entries 358
Mean 1.458
Std Dev 1.523
mixed
Entries 0
Mean 0
Std Dev 0
charm
Entries 0
Mean 0
Std Dev 0
uds
Entries 1
Mean 2
Std Dev 0
0
10
20
30
40
50
0
1
2
3
4
5
6
7
8
9
10

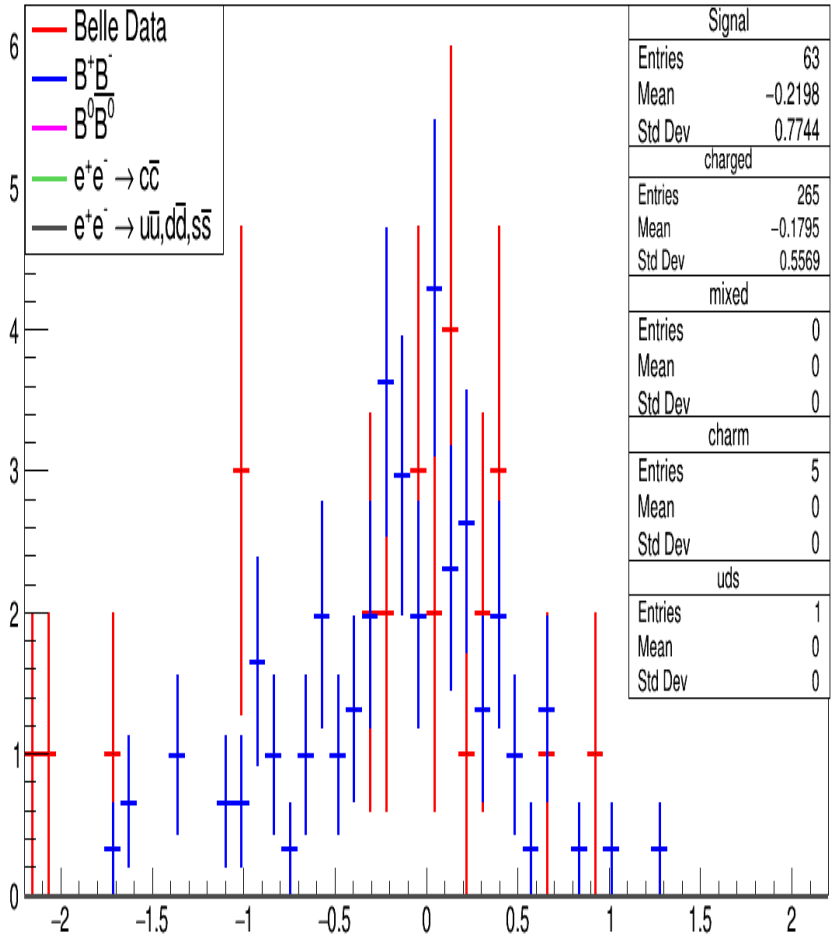

Number of photons for abs(m_hadROE-2.006)<0.03
Belle Data
B+B-
B0B0
e+e- → cc̄
e+e- → uū,dd̄,ss̄
Signal
Entries 63
Mean 2.571
Std Dev 1.498
charged
Entries 265
Mean 2.494
Std Dev 1.605
mixed
Entries 0
Mean 0
Std Dev 0
charm
Entries 5
Mean 4
Std Dev 1.897
uds
Entries 1
Mean 1
Std Dev 0
0 2 4 6 8 10 12 14 16 18
0 1 2 3 4 5 6 7 8 9 10


Number of photons for abs(m_hadROE-1.96)<0.03
Belle Data
B+B-
B0B0
e+e- → cc̄
e+e- → uū,dd̄,ss̄
Signal
Entries 97
Mean 2.392
Std Dev 1.418
charged
Entries 298
Mean 2.49
Std Dev 1.504
mixed
Entries 0
Mean 0
Std Dev 0
charm
Entries 3
Mean 4.333
Std Dev 0.4714
uds
Entries 1
Mean 7
Std Dev 0
0 5 10 15 20 25 30 35
0 1 2 3 4 5 6 7 8 9 10

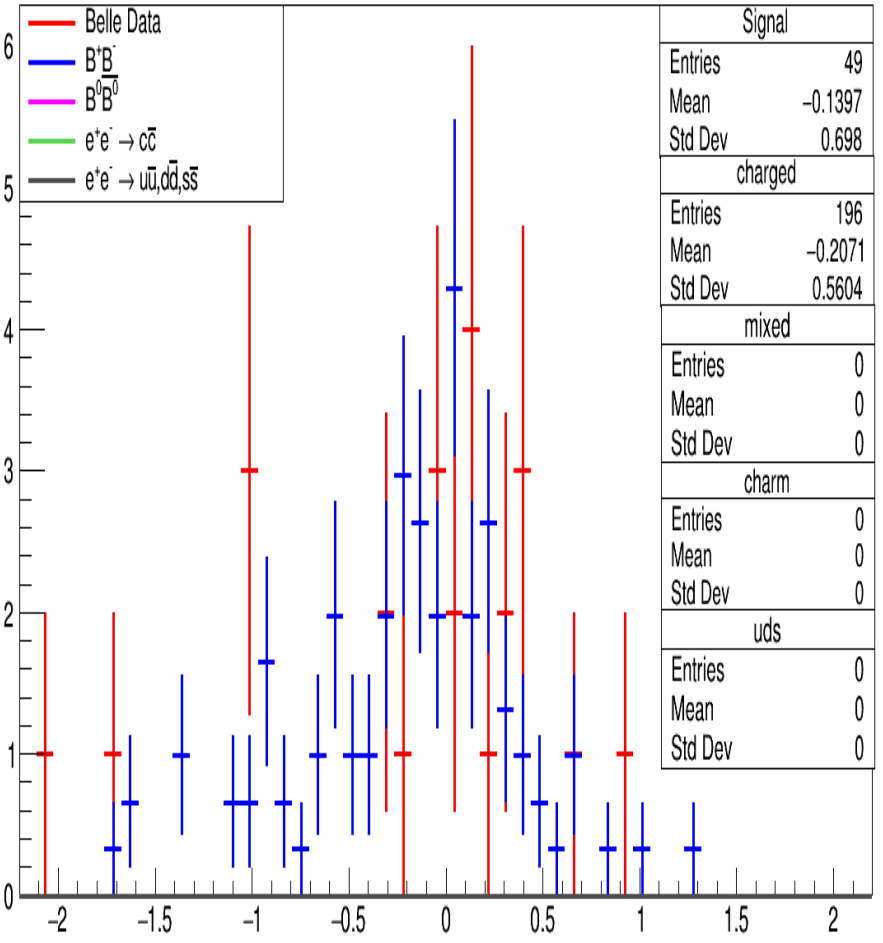

Best case ((cosθ1,cosθ2) + cosθtag) for abs(m_hadROE-1.86)<0.015
Belle Data
B+B-
B0B0
e+e- → cc̄
e+e- → uū,dd̄,ss̄
Signal
Entries 119
Mean −0.272
Std Dev 0.5051
charged
Entries 358
Mean −0.3154
Std Dev 0.5515
mixed
Entries 0
Mean 0
Std Dev 0
charm
Entries 0
Mean 0
Std Dev 0
uds
Entries 1
Mean 0
Std Dev 0


Best case ((cosθ1,cosθ2) + cosθtag) for abs(m_hadROE-1.86)<0.015 and abs(m_Jpsi-3.1)<0.015
Belle Data
B+B-
B0B0
e+e- → cc̄
e+e- → uū,dd̄,ss̄
Signal
Entries 87
Mean −0.2898
Std Dev 0.532
charged
Entries 266
Mean −0.3022
Std Dev 0.5438
mixed
Entries 0
Mean 0
Std Dev 0
charm
Entries 0
Mean 0
Std Dev 0
uds
Entries 0
Mean 0
Std Dev 0

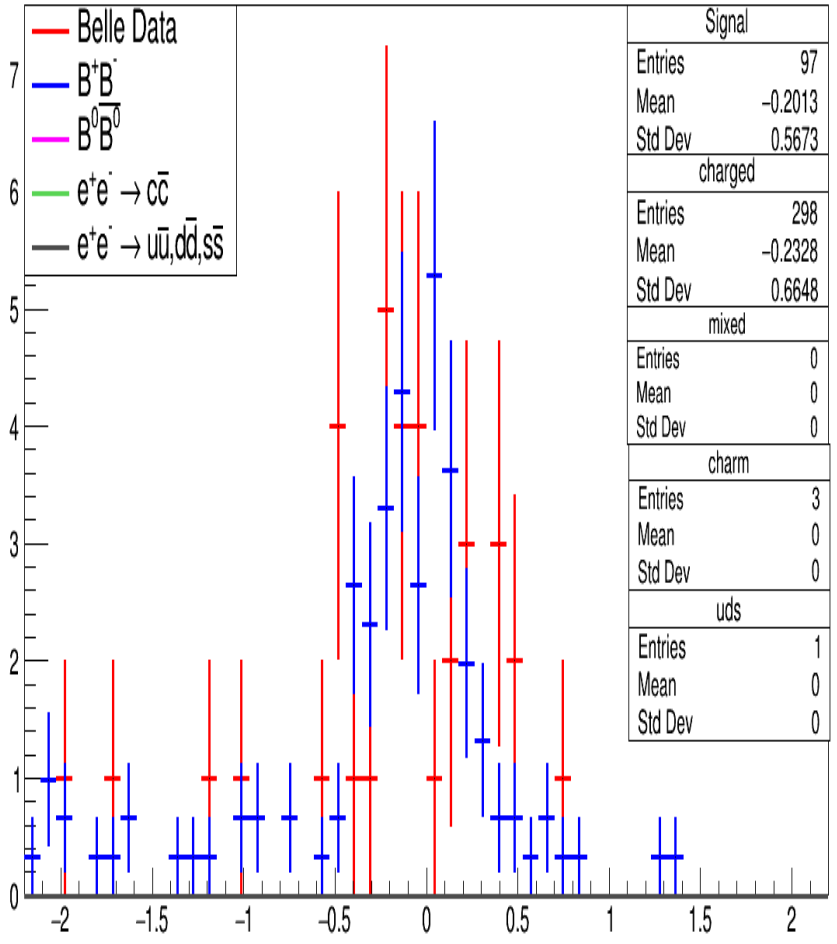
Best case $((\cos\theta_1,\cos\theta_2) + \cos\theta_{tag})$ for abs(m_hadROE-2.006)<0.03



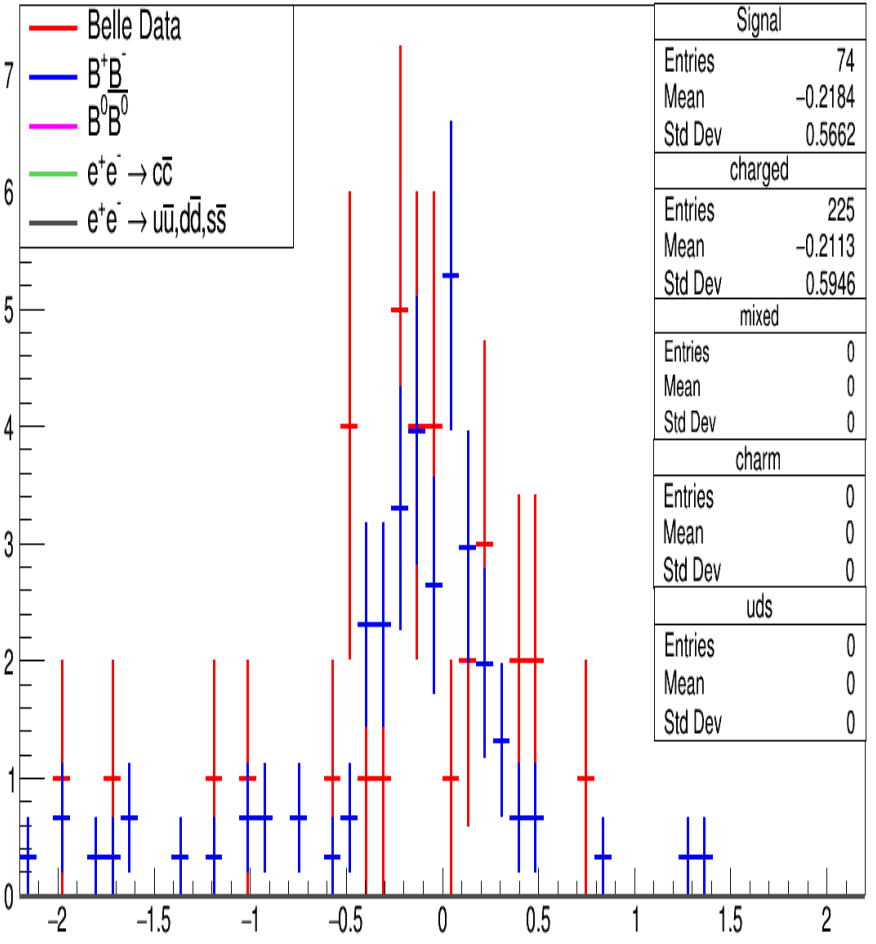
Best case $((\cos\theta_1,\cos\theta_2) + \cos\theta_{tag})$ for abs(m_hadROE-2.006)<0.03 and abs(m_Jpsi-3.1)<0.015



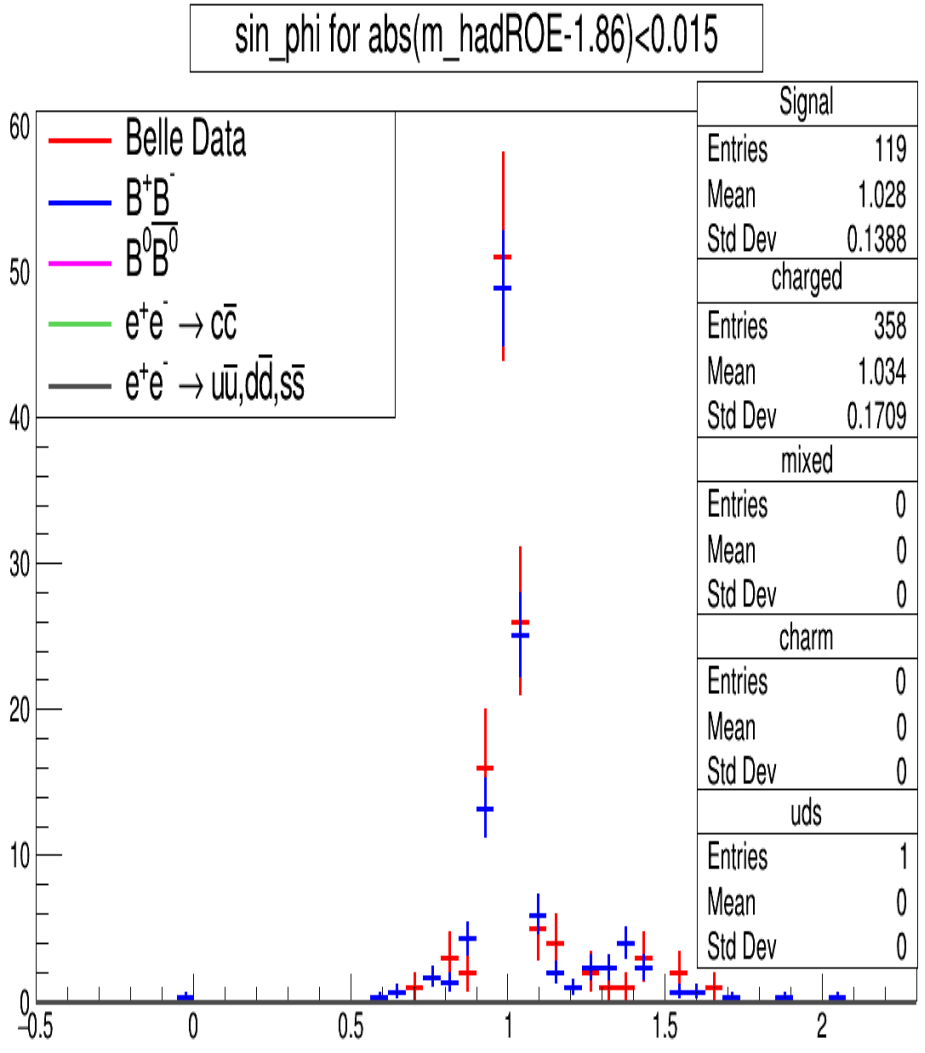
Best case ((cosθ$_1$,cosθ$_2$) + cosθ$_{tag}$) for abs(m_hadROE-1.96)<0.03

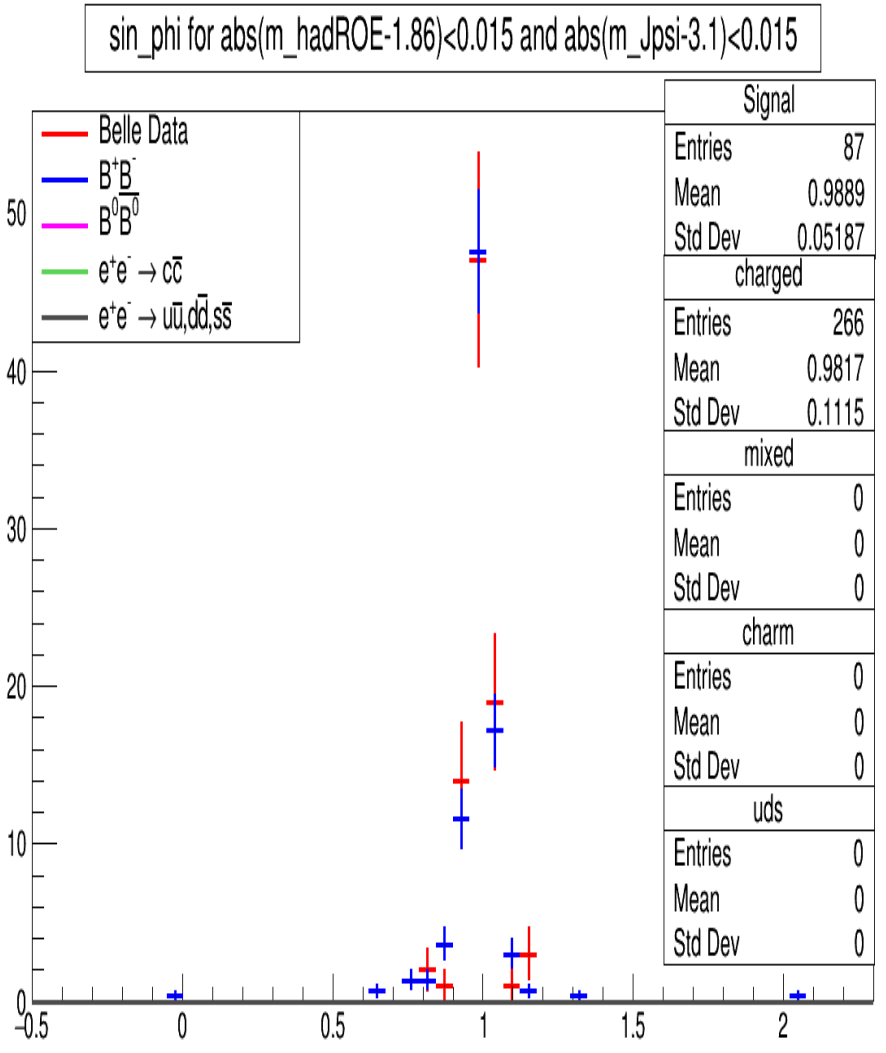


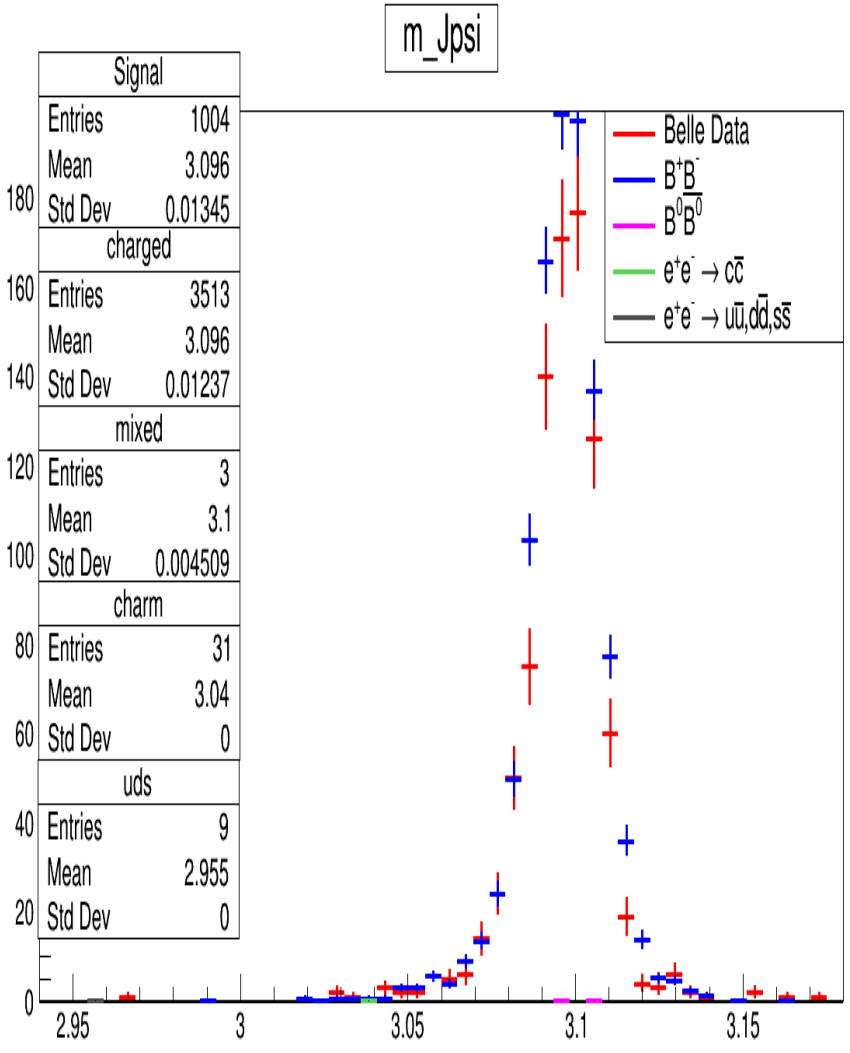
Best case ((cosθ$_1$,cosθ$_2$) + cosθ$_{tag}$) for abs(m_hadROE-1.96)<0.03 and abs(m_Jpsi-3.1)<0.015

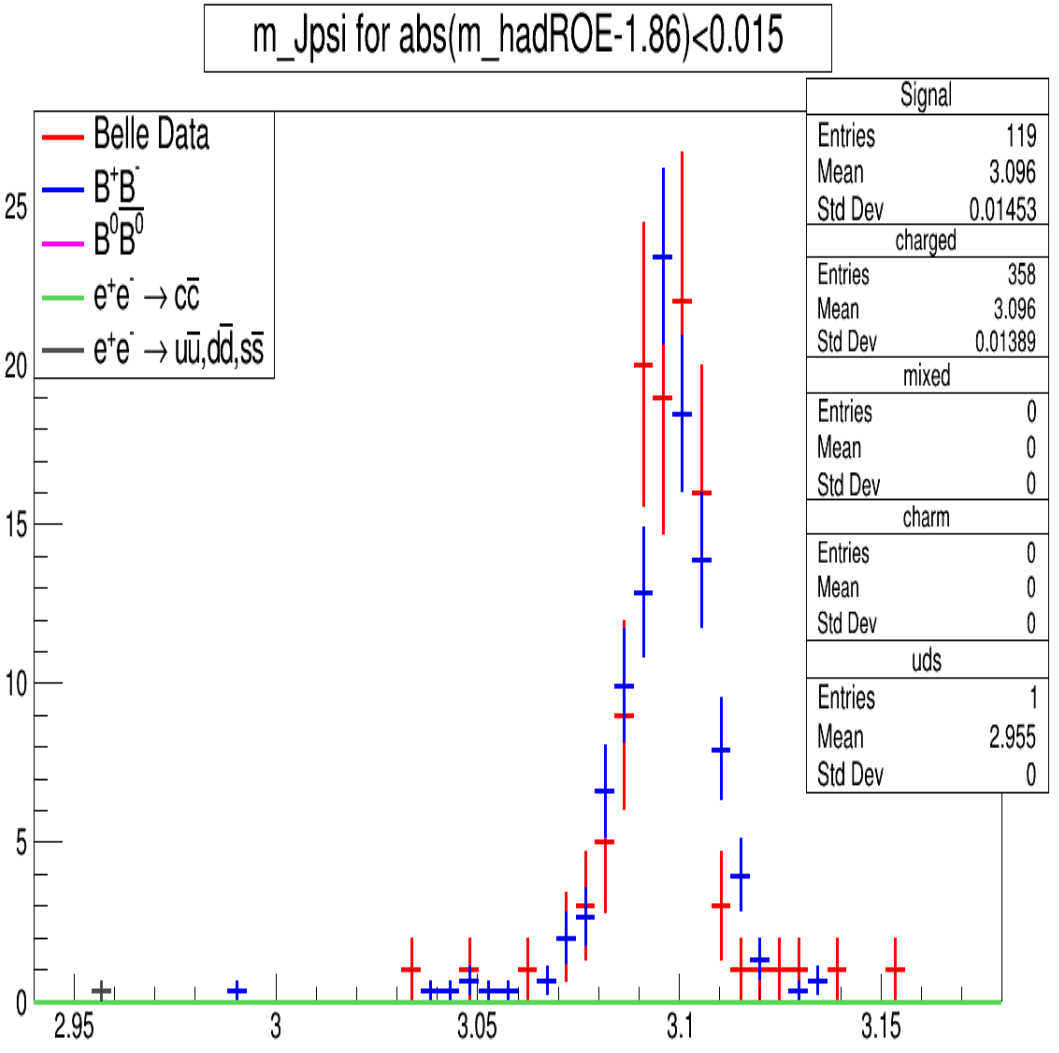


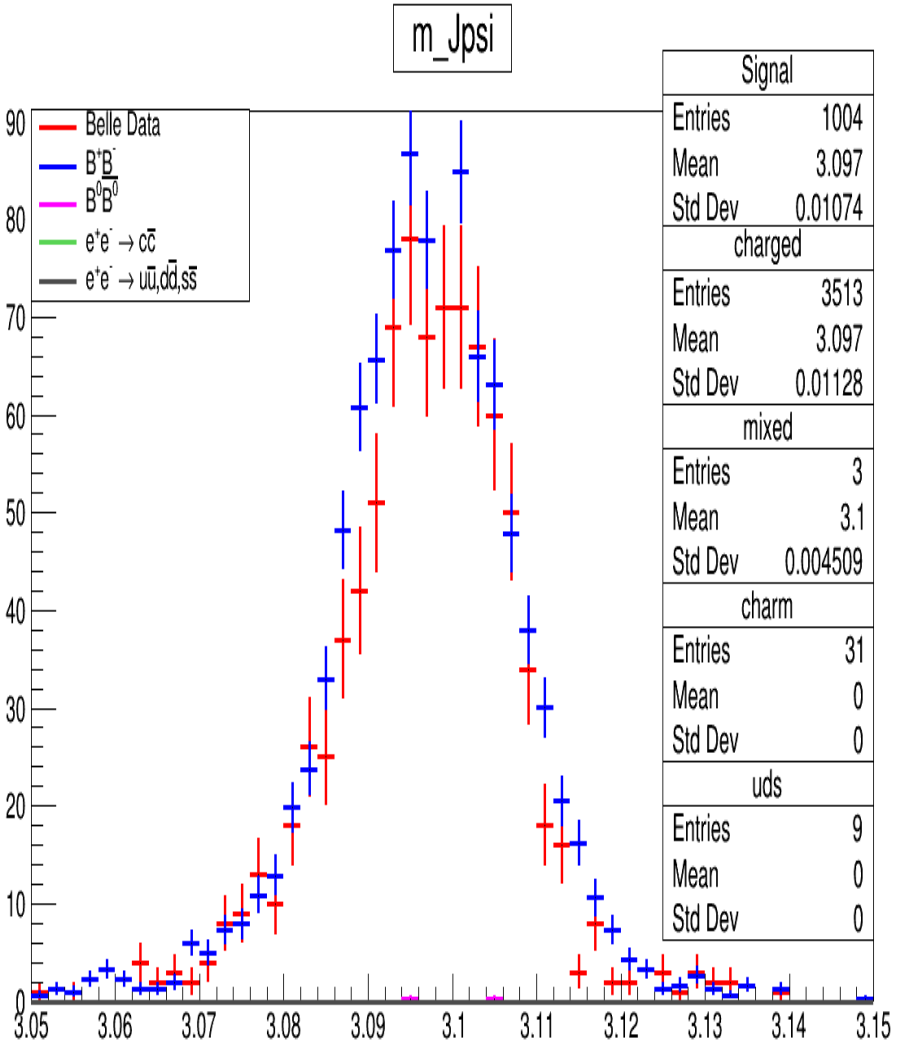
Backup

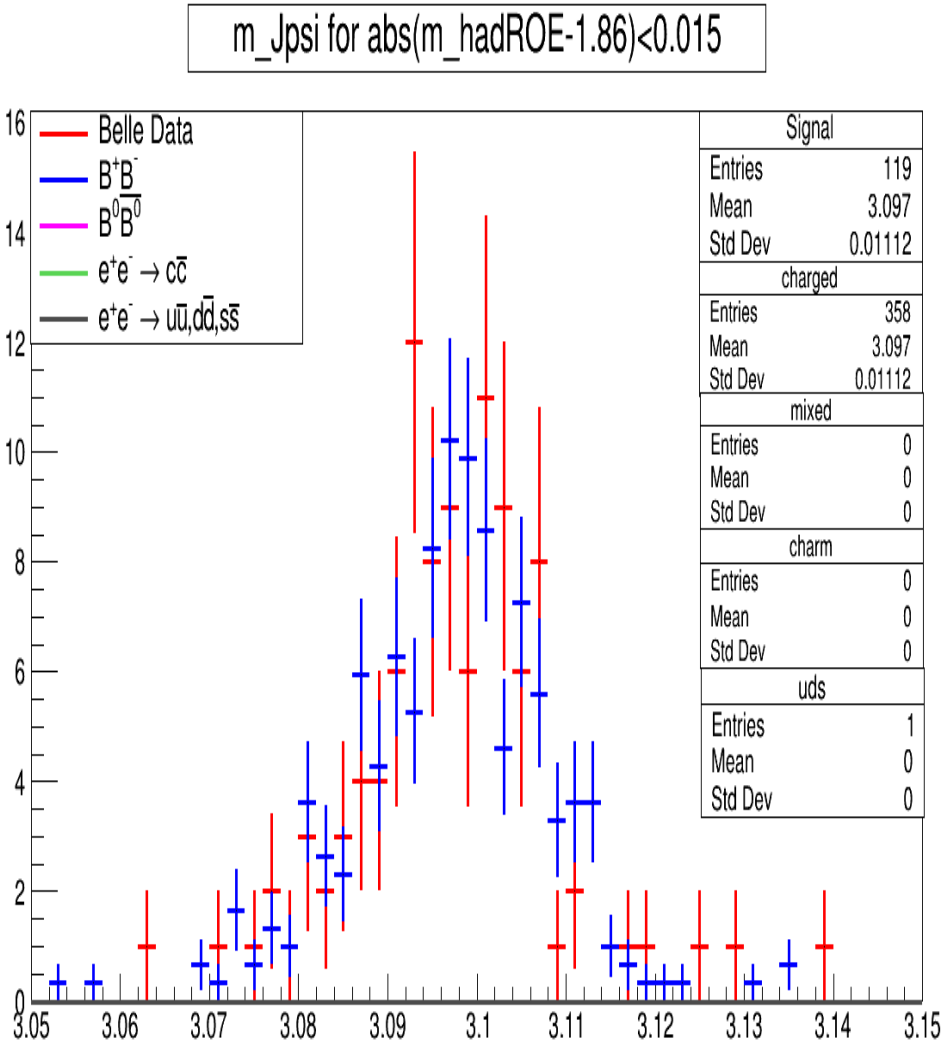

sin_phi for abs(m_hadROE-1.86)<0.015
Belle Data
B^+B^-
$B^0\bar{B}^0$
$e^+e^- \to c\bar{c}$
$e^+e^- \to u\bar{u},d\bar{d},s\bar{s}$
Signal
Entries 119
Mean 1.028
Std Dev 0.1388
charged
Entries 358
Mean 1.034
Std Dev 0.1709
mixed
Entries 0
Mean 0
Std Dev 0
charm
Entries 0
Mean 0
Std Dev 0
uds
Entries 1
Mean 0
Std Dev 0

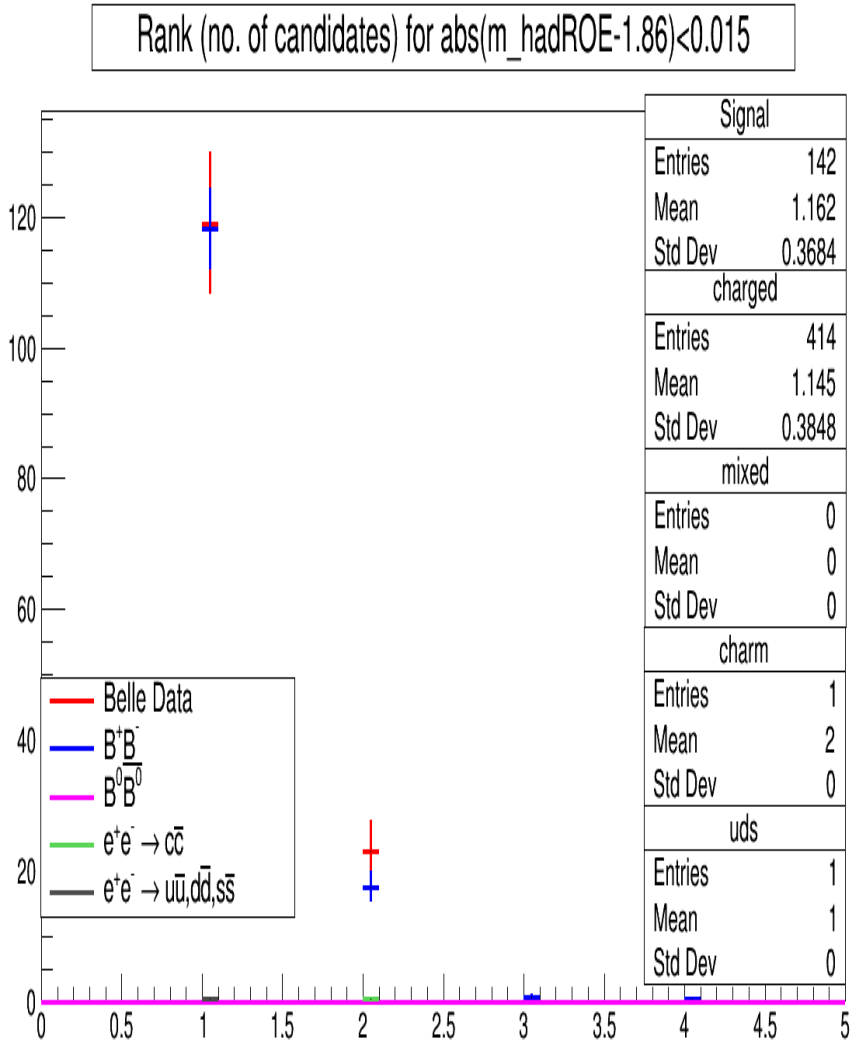

sin_phi for abs(m_hadROE-1.86)<0.015 and abs(m_Jpsi-3.1)<0.015
Belle Data
B^+B^-
$B^0\bar{B}^0$
$e^+e^- \to c\bar{c}$
$e^+e^- \to u\bar{u},d\bar{d},s\bar{s}$
Signal
Entries 87
Mean 0.9889
Std Dev 0.05187
charged
Entries 266
Mean 0.9817
Std Dev 0.1115
mixed
Entries 0
Mean 0
Std Dev 0
charm
Entries 0
Mean 0
Std Dev 0
uds
Entries 0
Mean 0
Std Dev 0

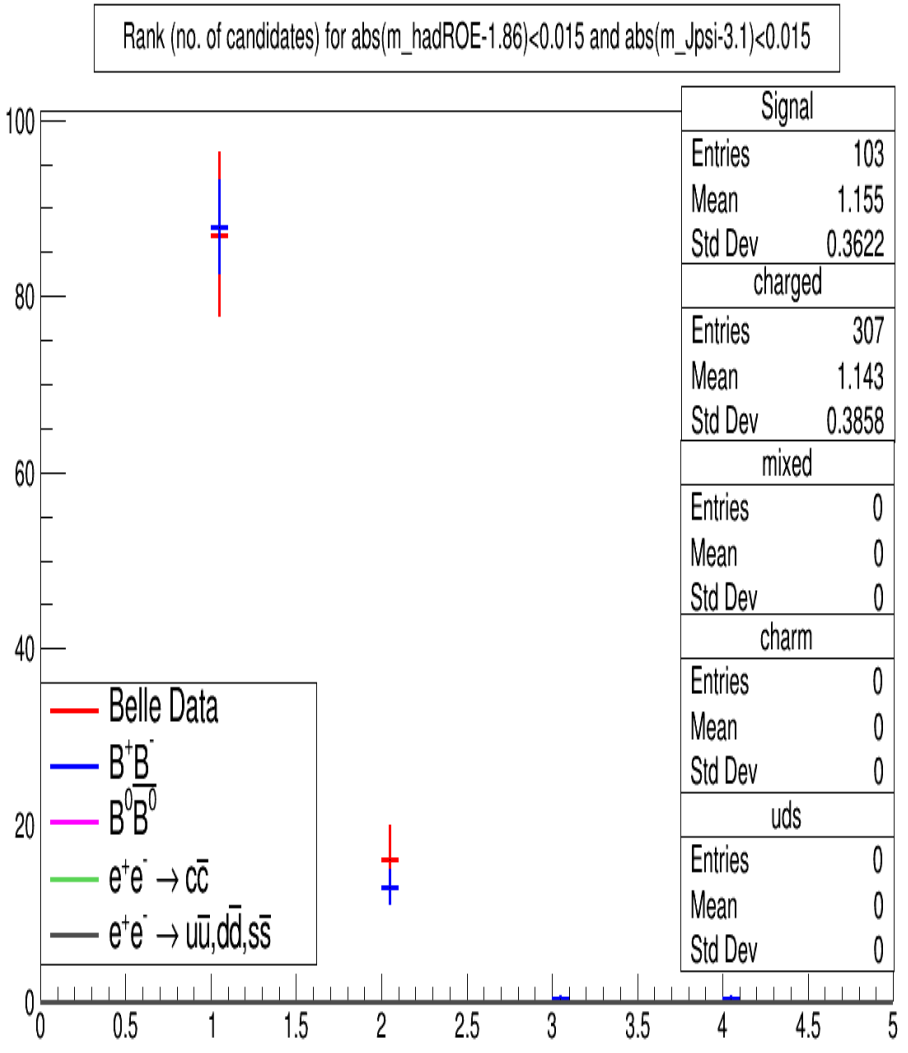

m_Jpsi
Signal
Entries 1004
Mean 3.096
Std Dev 0.01345
charged
Entries 3513
Mean 3.096
Std Dev 0.01237
mixed
Entries 3
Mean 3.1
Std Dev 0.004509
charm
Entries 31
Mean 3.04
Std Dev 0
uds
Entries 9
Mean 2.955
Std Dev 0
Belle Data
B^+B^-
$B^0\bar{B}^0$
$e^+e^- \to c\bar{c}$
$e^+e^- \to u\bar{u},d\bar{d},s\bar{s}$
0
20
40
60
80
100
120
140
160
180
2.95
3
3.05
3.1
3.15


m_Jpsi for abs(m_hadROE-1.86)<0.015
Signal
Entries 119
Mean 3.096
Std Dev 0.01453
charged
Entries 358
Mean 3.096
Std Dev 0.01389
mixed
Entries 0
Mean 0
Std Dev 0
charm
Entries 0
Mean 0
Std Dev 0
uds
Entries 1
Mean 2.955
Std Dev 0
Belle Data
B^+B^-
$B^0\bar{B}^0$
$e^+e^- \to c\bar{c}$
$e^+e^- \to u\bar{u},d\bar{d},s\bar{s}$
0
5
10
15
20
25
2.95
3
3.05
3.1
3.15


m_Jpsi
Belle Data
B^+B^-
$B^0\bar{B}^0$
$e^+e^- \to c\bar{c}$
$e^+e^- \to u\bar{u},d\bar{d},s\bar{s}$
Signal
Entries 1004
Mean 3.097
Std Dev 0.01074
charged
Entries 3513
Mean 3.097
Std Dev 0.01128
mixed
Entries 3
Mean 3.1
Std Dev 0.004509
charm
Entries 31
Mean 0
Std Dev 0
uds
Entries 9
Mean 0
Std Dev 0
0 10 20 30 40 50 60 70 80 90
3.05 3.06 3.07 3.08 3.09 3.1 3.11 3.12 3.13 3.14 3.15


m_Jpsi for abs(m_hadROE-1.86)<0.015
Belle Data
B^+B^-
$B^0\bar{B}^0$
$e^+e^- \to c\bar{c}$
$e^+e^- \to u\bar{u},d\bar{d},s\bar{s}$
Signal
Entries 119
Mean 3.097
Std Dev 0.01112
charged
Entries 358
Mean 3.097
Std Dev 0.01112
mixed
Entries 0
Mean 0
Std Dev 0
charm
Entries 0
Mean 0
Std Dev 0
uds
Entries 1
Mean 0
Std Dev 0
0 2 4 6 8 10 12 14 16
3.05 3.06 3.07 3.08 3.09 3.1 3.11 3.12 3.13 3.14 3.15


Rank (no. of candidates) for abs(m_hadROE-1.86)<0.015
Signal
Entries 142
Mean 1.162
Std Dev 0.3684
charged
Entries 414
Mean 1.145
Std Dev 0.3848
mixed
Entries 0
Mean 0
Std Dev 0
charm
Entries 1
Mean 2
Std Dev 0
uds
Entries 1
Mean 1
Std Dev 0
Belle Data
B+B-
B0B0
e+e- → cc
e+e- → uu,dd,ss
0 20 40 60 80 100 120
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5


Rank (no. of candidates) for abs(m_hadROE-1.86)<0.015 and abs(m_Jpsi-3.1)<0.015
Signal
Entries 103
Mean 1.155
Std Dev 0.3622
charged
Entries 307
Mean 1.143
Std Dev 0.3858
mixed
Entries 0
Mean 0
Std Dev 0
charm
Entries 0
Mean 0
Std Dev 0
uds
Entries 0
Mean 0
Std Dev 0
Belle Data
B+B-
B0B0
e+e- → cc
e+e- → uu,dd,ss
0 20 40 60 80 100
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5