
Subject: One question about tracking efficiency
Posted by [Yutie Liang](#) on Wed, 21 Apr 2010 15:51:38 GMT
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Dear all,

I met one problem when I use the PandaRoot to do one simple study. The decay chain of my study is: $\Psi(3770) \rightarrow D^+ D^- \rightarrow (k^- \pi^+ \pi^+)(k^+ \pi^- \pi^-)$
I simulated 10k signals, but only 300~400 events survived.
I think this efficiency is too low.

The following is the detailed information of one event from generator. TrackIDs of $(k^-, \pi^+, \pi^+, k^+, \pi^-, \pi^-)$ are always (0,1,2,3,4,5). So, I use this trackID as PID in this study.

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0    9
  N   Id Ist  M1  M2  DF  DL    px    py    pz    E    t    x    y    z
  0  40443  2  -1  -1   1   2  0.00000000 -0.00000000 6.57879835 7.58363969 0.00000000
0.00000000 0.00000000 0.000000
000
  1   411  2   0   0   3   5 -0.02342460 -0.12417095 3.72753839 4.17190509 0.00000000
0.00000000 -0.00000000 0.0000
00000
  2  -411  2   0   0   6   8  0.02342460  0.12417095 2.85125996 3.41173460 0.00000000
0.00000000 -0.00000000 0.00000
000
  3  -321  1   1   1  -1  -1 -0.41376210  0.45311777 0.95670547 1.23916104 6.38056669
-0.03582590 -0.18990870 5.700
94639
  4   211  1   1   1  -1  -1  0.25929310 -0.57261601 2.59179905 2.67058498 6.38056669
-0.03582590 -0.18990870 5.700
94639
  5   211  1   1   1  -1  -1  0.13104440 -0.00467271 0.17903387 0.26215907 6.38056669
-0.03582590 -0.18990870 5.700
94639
  6   321  1   2   2  -1  -1  0.01936009 -0.00991458 0.09054525 0.50238581 1.18131702
0.00811080 0.04299434 0.98725
203
  7  -211  1   2   2  -1  -1  0.24342156  0.42046406 1.79061469 1.86059797 1.18131702
0.00811080 0.04299434 0.987252
03
  8  -211  1   2   2  -1  -1 -0.23935704 -0.28637852 0.97010002 1.04875082 1.18131702
0.00811080 0.04299434 0.9872
5203
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```

I checked, and found that the tracking efficiency of $(k^-, \pi^+, \pi^+, k^+, \pi^-, \pi^-)$ is only about 50~60%, when MC trackID' match is required. this low efficiency of each track could explain the low efficiency of this channel.
but, when I did single track study, the tracking efficiency of π^+ with MCtrackID match is close to 80%. This is also low, but still acceptable considering McID match.

It seems that when there are multiple tracks, 6 in my case, the tracking efficiency will become worse. Is this the problem?
I hope that's only one bug of my analysis.

Thanks

yutie
