
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.

```
-----  
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 0.000  
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
