

---

Subject: One question about tracking efficiency  
Posted by [Yutie Liang](#) on Wed, 21 Apr 2010 15:51:38 GMT  
[View Forum Message](#) <> [Reply to Message](#)

---

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 0.0000
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
-----
```

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  $\pi^+$  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

---