

Problem

What happens, when, and how to reproduce the problem

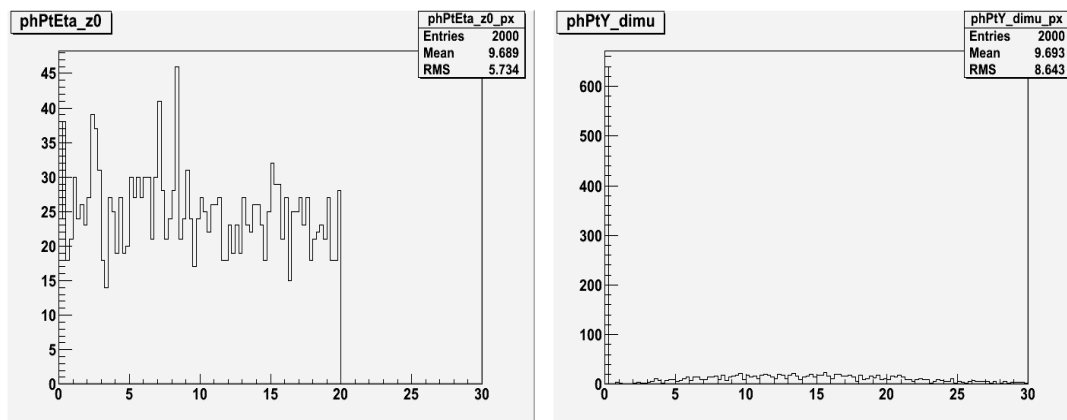
==> Run a **Pythia6PtGun** to generate $Z^0 \rightarrow \mu\mu$, with $p_T[0, 20] \text{ GeV}/c$, in `CMSSW_3_3_4`

* The python file is this.

* turned off initial/final state radiation, and modified the `pythiaDefault_cff.py` also to include $\mu\mu$ decay only, like this.

* run this analyzer with this python file.

* In the analyzer, look at the generated Z^0 p_T distribution (left figure below), and then, loop over the daughter muons, pair them, and retrieve the Z^0 parent (right figure below).



Basically, what it happens, see also the bellow printout, is that though the parent Z^0 has a $p_T \neq 0$, the muons are decayed back-to-back, as if the Z^0 is at rest (the boost part of the decay was not propagated properly). It happens only with the Z^0 (tried with J/ψ and don't get into this issue), and it's not a PYTHIA problem (I ran PYTHIA 6-422, and it never gets into this situation, so the decayer itself is fine).

```
pt_z0Gen = 12.602          px = -7.59486   py = 10.0563   pz = 254.636  p = 254.94  E =
E_mu1 = 184.443 pt1=33.5841 px1 = 6.15032   py1 = -33.0161 pz1 = 181.36   eta1 = 2.38804 phi1 = -1.
E_mu2 = 84.1065 pt2=45.1056 px2 = -13.6769  py2 = 42.982   pz2 = 70.9885  eta2 = 1.23503 phi2 = 1.
pt_z0Dimu = 12.4888       px = -7.52661   py = 9.96591   pz = 252.348  p = 252.657  E = 2
```

```
pt_z0Gen = 18.302          px = -13.6041  py = 12.2437   pz = -2.07556 p = 18.4198  E
E_mu1 = 46.6812 pt1=40.4225 px1 = -11.1639  py1 = 38.8504  pz1 = -23.3484 eta1 = -0.549529 phi1 = -1.
E_mu2 = 46.6812 pt2=40.4225 px2 = 11.1639   py2 = -38.8504 pz2 = 23.3484  eta2 = 0.549529 phi2 = -1.
pt_z0Dimu = 0              px = 0          py = 0          pz = 0
```

```
pt_z0Gen = 13.9235        px = 12.453     py = -6.22797  pz = 42.1019  p = 44.3445  E
E_mu1 = 46.0783 pt1=14.1707 px1 = 4.48367   py1 = -13.4426 pz1 = -43.845  eta1 = -1.8477 phi1 = -1.
E_mu2 = 46.0783 pt2=14.1707 px2 = -4.48367  py2 = 13.4426  pz2 = 43.845   eta2 = 1.8477 phi2 = 1.89
pt_z0Dimu = 0              px = 0          py = 0          pz = 0
```

This topic: `Main > Xx`

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