

$$D_S^{*+} \rightarrow D_S^+ e^+ e^-$$

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## Contents

- Generic MC shows  $\pi^0 \rightarrow e^+ e^- \gamma$

# N-Tuplizer problem fixed

Had reported 41 events in generic MC after all selection criteria when 5 from conversion background were expected.

Most telling plot (double hump on bottom plot) ->

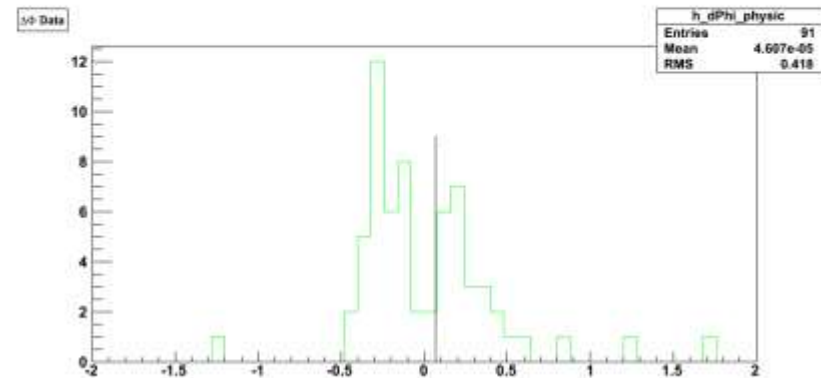
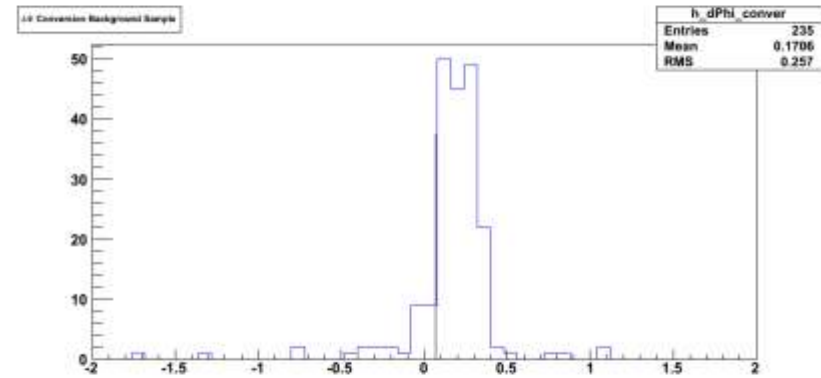
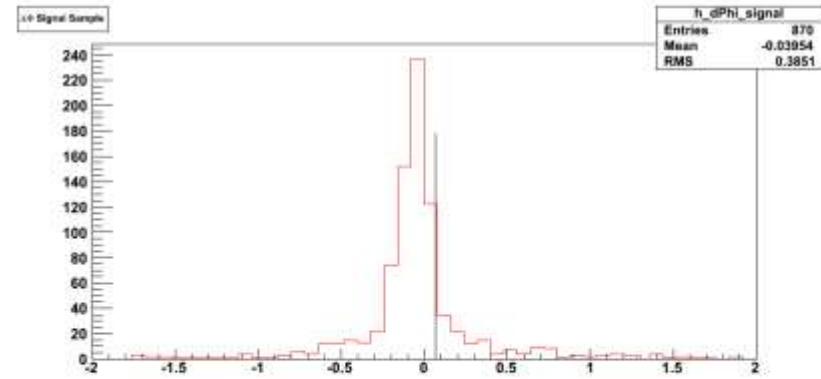
Told us that electrons and positrons were getting interchanged by this code in my n-tuplizer when Ds- were encountered:

```
dsStarToDsElectrons = allTagsList *  
electrons.minus() * electrons.plus();
```

Where electrons are a CDElectronList containing all electrons and positrons, allTagsList is a DTagList of 9 Ds+ decays, dsStarToDsElectrons is a CDDecayList

Fixed this and we now have 10 generic MC events where 5 are expected from conversions.

So what are the rest?



$$\pi_0 \rightarrow e^+ e^- \gamma !$$

We expect 5 conversion events after selection criteria, but we see only 2 conversion events in the 10 events left over in the generic MC.

8 of them have  $\pi_0 \rightarrow e^+ e^- \gamma$  events.

Run 23085, event 14904

```
psi(4160) --> D*- D+ pi0;  
D*- --> D- pi0;  
pi0 --> e+ e- gamma
```

Run 230812, event 1070

```
psi(4160) --> D_s*+ D_s-;  
D_s*+ --> D_s+ gamma;  
D_s+ --> rho+ eta';  
eta' --> pi0 pi0 eta;  
pi0 --> e+ e- gamma
```

$$\pi_0 \rightarrow e^+ e^- \gamma !$$

Run 230819, event 1534  
psi(4160) --> D\_s\*+ D\_s-;  
D\_s\*+ --> D\_s+ gamma;  
D\_s+ --> eta mu+ nu\_mu;  
eta --> pi0 pi0 pi0;  
pi0 --> e+ e- gamma

Run 231112, event 845  
psi(4160) --> D\_s\*- D\_s+;  
D\_s+ --> pi+ pi+ pi- pi0;  
pi0 --> e+ e- gamma

Run 231200, event 1217  
Conversion

Run 231443, event 3126  
psi(4160) --> D\_s\*- D\_s+;  
D\_s\*- --> D\_s- gamma;  
D\_s- --> rho- eta;  
eta --> pi0 pi0 pi0;  
pi0 --> e+ e- gamma

Run 231637, event 13649  
psi(4160) --> D\_s\*+ D\_s-;  
D\_s- --> phi rho-;  
rho- --> pi- pi0;  
pi0 --> e+ e- gamma

Run 231923, event 5080  
Conversion, but e+e- doesn't match reco!

Run 232008, event 8741  
psi(4160) --> D\*0 anti-D\*0;  
D\*0 --> D0 pi0;  
D0 --> a\_1+ K-;  
a\_1+ --> rho+ pi0;  
pi0 --> e+ e- gamma

Run 232222, event 14279  
psi(4160) --> D\_s\*- D\_s+;  
D\_s\*- --> D\_s- gamma;  
D\_s- --> pi- pi- pi+ pi0 pi0 pi0;  
pi0 --> e+ e- gamma