

# Table of Contents

<b>DaVinci Tutorial 5.....</b>	<b>1</b>
Slides.....	1
Use the PrintDecayTree algorithm to print the reconstructed tree.....	1
Use the PrintMCTree algorithm to print the MC true tree.....	1
<b>Go to DaVinciTutorial6.....</b>	<b>3</b>

# DaVinci Tutorial 5

We have the sequence to select Bs candidates but no idea if we do it right. We will start with adding some debugging tools.

## Slides

This tutorial corresponds to the slides last shown here [↗](#).

## Use the `PrintDecayTree` algorithm to print the reconstructed tree.

```
from Configurables import PrintDecayTree, PrintDecayTreeTool
tree = PrintDecayTree("PrintFoundBs")
```

- You need to give it the location where to find your head Particle. (in our case `Inputs = [ SeqBs2JpsiPhi.outputLocation() ]`).
- You need to tell the `PrintDecayTreeTool` what variables to print. For instance

```
tree.addTool( PrintDecayTreeTool, name = "PrintDecay" )
tree.PrintDecay.Information = "Name M P Px Py Pz Pt chi2"
```

You can see a list of variables here [↗](#)

- Don't forget to declare where you want to run your algorithm. A good idea is the monitoring sequence which is always run after the user algorithm. Do

```
DaVinci().MoniSequence += [ tree ]          # The monitoring stuff
```

You should see something like that in your log file:

```
PrintFoundBs.PrintDecay                                INFO
<----->----- Particle ----->----->
Name           M           P           Px           Py           Pz           Pt           chi2
           MeV           MeV           MeV           MeV           MeV           MeV
B_s0           5351.02    84792.49   -1078.03     806.66    84781.80    1346.43     3.15
+-->phi(1020)   1019.20    40180.02   -446.29   -1077.38    40163.09    1166.16     8.96
|+-->K+         493.68    18956.49   -202.68   -631.37    18944.89     663.10     1.06
|+-->K-         493.68    21224.40   -252.57   -446.01    21218.21     512.56     0.88
+-->J/psi(1S)   3079.47    44663.99   -629.67    1873.95    44620.22    1976.91     1.69
  +-->mu+       105.66    32007.70     694.44    2121.09    31929.79    2231.88     0.85
  +-->mu-       105.66    12759.41  -1323.64   -247.43    12688.16    1346.57     0.94
```

## Use the `PrintMCTree` algorithm to print the MC true tree.

```
from Configurables import PrintMCTree, PrintMCDecayTreeTool
mctree = PrintMCTree("PrintTrueBs")
```

It uses the `PrintMCDecayTreeTool` internally, which has the same syntax as the `PrintDecayTreeTool`.

```
mctree.addTool( PrintMCDecayTreeTool, name = "PrintMC" )
mctree.PrintMC.Information = "Name M P Px Py Pz Pt"
```

- In this case you have to tell the algorithms for which particles it has to print the tree.

```
mctree.ParticleNames = [ "B_s0", "B_s~0" ]
```

- It is recommended to give the depth of the tree in order to avoid having all particles from interaction with matter.

```
mctree.Depth = 2 # down to the K and mu
```

- Increase the `Depth` value to see all the particles created in the detector. Most of them are created in the calorimeters between 11 and 15m.
- If you add `mctree` as a member of the sequencer it will display information only about events where there is a selected candidate. If you want to see information about all the events you need to add it to `DaVinci().MoniSequence`.

The output should look like:

```
PrintTrueBs                                     INFO Printing MC tree for particles
PrintTrueBs.PrintMCDecayTreeTool                INFO
B_s~0      5366.77  82776.55   654.36   798.35  82770.11  1032.25
+-->J/psi(1S) 3096.93  43814.97  1718.46   887.50  43772.26  1934.10
|+-->mu+      105.66  28838.35  1078.37  2016.86  28747.52  2287.05
|+-->mu-      105.66  14493.28  569.92  -1141.92  14436.98  1276.24
|+-->gamma     0.00   591.63   70.16   12.59   587.32   71.28
|+-->gamma     0.00    0.43    0.01   -0.03    0.43    0.03
|+-->gamma     0.00    0.01    0.00    0.00    0.01    0.00
+-->phi(1020) 1029.89  39012.47 -1064.11  -89.15  38997.85  1067.84
  +-->K+      493.68  17506.04 -437.16   90.51  17500.35  446.43
  +-->K-      493.68  21507.39 -626.95 -179.66  21497.50  652.18
```

The solution to this part is to be found in `solutions/DaVinci5/`

# Go to DaVinciTutorial6

-- PatrickKoppenburg - 01 Oct 2007 -- PatrickKoppenburg - 13 Jun 2008 -- PatrickKoppenburg - 05 Jan 2009  
-- PatrickSKoppenburg - 16-Oct-2012 -- PatrickSKoppenburg - 30-Sep-2013

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