Status Mass Production w/ ILCDIRAC

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Status

ilcdirac productions validation

Status

- We can now run productions locally.
 - We can set Mokka random seeds.
- We can download the tarball with the apps. executables.
- Looking for differences comming when: using/not using ilcdirac.
 - Running over same input files, under same conditions (random seed, software versions, OS).
 - Each time, the only difference is using/not using the ilcdirac to run the job.
 - Assumes Mokka reproductivity is guarantee: same input provides always same output (Is this true?).

Is Mokka reproductivity guarantee?

- There are two minimum input differences: in the Mokka steer file:
 - The steer file should be different: at least the file names, to avoid overwrite.
 - ilcdirac introduced several comment lines: each time set one parameter in the steer file.
- Any of these two differences should affect the result.

Comment lines on Mokka steer may change output

- I have check out separately these two point.
- Output Icio file name has no effect.
- But comment lines may have (!).

Just Adding a Different Comment String

diff mokka_6.steer mokka_7.steer

```
56c56
< # hello world
---
> # To be a comment or not to be a comment
64c64

/Mokka/init/lcioFilename out/out_6.slcio
---
> /Mokka/init/lcioFilename out/out_7.slcio
```

Same software version (v01-14-01) used to sim/rec

- First 2 events no difference.
- Since the 3rd event, we see differences in the event collections.
- Previous Diff. in the steer file are the only differences
 - Same event, but different # of particles (affect E/P net balance).
 - Input stdhep, soft versions are the same.

Comment String Same Length

diff mokka_20_bis.steer mokka_19_bis.steer

```
56c56
< # my mother says i'm a comment, but i'm not
---
> # my name is de la isla, camaron de la isla
64c64
< /Mokka/init/lcioFilename out/out_20_bis.slcio
---
> /Mokka/init/lcioFilename out/out_19_bis.slcio
```

- I got same output.
 - Tested on ilcsoft v01-14-01 and v01-17-06.
- In this case both steer has same size.
 - I've been suggested to run using modified Mokka version not storing steer files in Icio header.
 - I have checkout that for Mokka tag mokka-08-03 and i get similar behaviour.

Using Latest ilcsoft (v01-17-06)

diff mokka_18_latest.steer mokka_19_latest.steer

```
56c56
< # my name is bond, james bond
---
> # my name is de la isla, camaron de la isla
64c64
< /Mokka/init/lcioFilename out/out_18_latest.slcio
---
> /Mokka/init/lcioFilename out/out_19_latest.slcio
```

- With this version i got same output.
- But the problem is still there (next slide).

ilcsoft (v01-17-06) Higher Verbosity Steer

diff mokka-ilcdirac_21.steer mokka-ilcdirac_22.steer

```
56d55
< #Set detector model to value specified
58456
< #Set debug level to 2
60d57
< #Set batch mode to true
62458
< #Set mac file to the one created on the site
64459
< #Setting random seed
66d60
< #Setting run number, same as seed
68,70c62,63
< #Set outputfile name to job specified
< /Mokka/init/lcioFilename out/out 21.slcio
< #Set processID as event parameter
> /Mokka/init/lcioFilename out/out 22.slcio
76c69
< #Set event start number to value given as job parameter
```

- Those comments are added by ilcdirac each time set an input parameter in the steering file.
- First 2 events looks same, but clear differences in advance!.

Last Comments

- The fact that comment lines on the steering file may affect simulation program sounds more like a bug than a desirable feature.
- For ilcdirac validation may have an impact because ilcdirac add several comment lines in the Mokka steer file.
- ilcdirac copies apps. executables from AFS (as far as i know).
- Marlin exec. carried by ilcdirac exactly binary copy as AFS file.
- For Mokka exec. file sizes dont match.

Where got ilcdirac the Mokka executable?

```
*) From AFS:

AFS_DIR=/afs/desy.de/project/ilcsoft/sw/x86_64_gcc41_sl5/v01-16-02/Marlin/v01-04/bin/
env find $AFS_DIR -name "Marlin" -printf "%s %p\n"

763903 /afs/desy.de/project/ilcsoft/sw/x86_64_gcc41_sl5/v01-16-02/Marlin/v01-04/bin/Marlin

*) From ilcdirac tarball:

ILC_DIR=/gpfs/fs01/ilc/users/calancha/ILCDIRAC/LocalArea/Marlinv01-16-02/Executable/
env find $ILC_DIR -name "Marlin" -printf "%s %p\n"

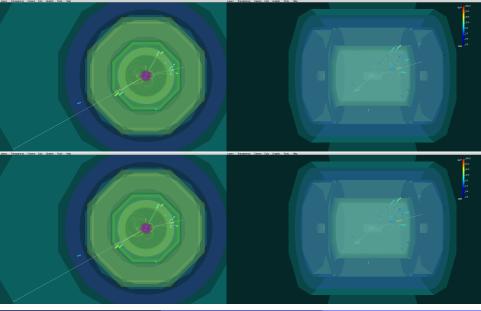
763903 /gpfs/fs01/ilc/users/calancha/ILCDIRAC/LocalArea/Marlinv01-16-02/Executable/Marlin
(same file)
```

```
**)ILC_DIR=/gpfs/fs01/ilc/users/calancha/ILCDIRAC/LocalArea/Mokka080003/Mokka
env find $ILC_DIR -name "Mokka" -printf "%s %p\n"
594839 /gpfs/fs01/ilc/users/calancha/ILCDIRAC/LocalArea/Mokka080003/Mokka
no same file found under:
/afs/desy.de/project/ilcsoft/sw/x86_64_qcc41_s15/
```

Back Up Slides

- Event display for a few events in one of the performed tests
 - Differences comming from inserting one comment line in the steer file.
- I did not check all the events.
 - Differences may be larger that showed here in other cases.

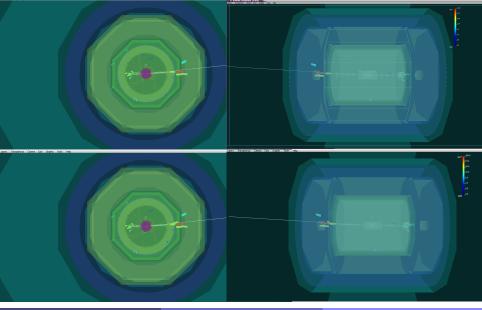
Event 0 (Same)



Event 0 (Same)

```
Applications Places System (1) 6 6 6 1
                                                                                                                                           (b) (c) P (d) ■ 2°C Fri Jan 30, 13:00
 DEBUG3 "MyDSTViewer"] Particle: 81 Type: -211 PX = -8.905301 PY = 15.492162 PZ = 13.206289 P_tot = 22.219755 Charge = -1.000000 E = 22.220194
 DEBUG3 "MgDSTViewer"] Particle: 82 Type: 211 PX = -9.242599 PY = 2.443500 PZ = 7.596540 P_tot = 12.210805 Charge = 1.000000 E = 12.211603
 DEBUG3 "MyDSTViewer"] Particle: 83 Type: 2112 PX = -0.303207 PY = -0.530821 PZ = -0.224371 P_tot = 0.651190 Charge = 0.000000 E = 0.651190
 DEBUG "MyDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MyDSTViewer"] Particle : 84 Type : 211 PX = -7.587360 PY = 1.368268 PZ = 3.890668 P_tot = 8.635826 Charge = 1.000000 E = 8.636953 DEBUG3 "MyDSTViewer"] Particle : 85 Type : 22 PX = -0.368959 PY = 0.390451 PZ = 0.410197 P_tot = 0.675903 Charge = 0.000000 E = 0.675903
 DEBUG "MyDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MuDSTViewer"] Particle: 86 Tupe: 22 PX = -0.521098 PY = 0.262364 PZ = 0.207729 P_tot = 0.619297 Charge = 0.000000 E = 0.619297
 DEBUG "MyDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MyDSTViewer"] Particle: 87 Type: 22 PX = -1.752102 PY = 0.659625 PZ = 0.500739 P_tot = 1.937965 Charge = 0.000000 E = 1.937965
 DEBUG "MuDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MuDSIViewer"] Particle : 88 Type : -211 PX = 1.605692 PY = 0.478037 PZ = 0.351499 P_tot = 1.711817 Charge = -1.000000 E = 1.717497
 MESSAGE "MyDSTViewer"]
 MESSAGE "MyDSTViewer"] Total Energy and Momentum Balance of Event
 MESSAGE "NuDSTViewer" | Energy = 449.246460 PX = -14.050467 PY = 5.846439 PZ = 59.123272 Charge = -3.000000
 MESSAGE "MyDSTViewer"]
DEBUG2 "MyDSTViewer"] Setup properties
 DEBUG2 "MyDSTViewer"] B_Field = 3.500000 T
 MESSAGE "MuDSTViewer"] Double click for picking, Press (ENTER) for the next event.
 WFO: new client - socketID: 8
-UU-:**--F1 t6
                             Bot 136325 (Shell:run)
DEBUG3 "MyDSTViewer"] Particle : 81 Type : -211 PX = 0.098722 PY = -0.755973 PZ = 0.259964 P_tot = 0.805495 Charge = -1.000000 E = 0.817497
DEBUG3 "MyDSTViewer"] Particle: 82 Type: 211 PX = 0.472929 PY = 0.153288 PZ = -0.180836 P_tot = 0.529039 Charge = 1.000000 E = 0.547140
 DEBUG3 "MyDSTViewer"] Particle: 83 Type: 2112 PX = 0.026042 PY = -0.420242 PZ = 0.412409 P_tot = 0.589374 Charge = 0.000000 E = 0.589374
 DEBUG "MuDSTViewer"] Low momentum particle given point instead of helix
DEBUG3 "MuDSTViewer"] Particle: 84 Type: 211 PX = -0.253829 PY = 0.493054 PZ = 0.409676 P_tot = 0.699394 Charge = 1.000000 E = 0.703380 DEBUG3 "MuDSTViewer"] Particle: 85 Type: 22 PX = -0.324991 PY = 0.335274 PZ = 0.241801 P_tot = 0.525828 Charge = 0.000000 E = 0.525828
 DEBUG "MuDSTViewer"] Low momentum particle given point instead of helix
 DEBUGS "MuDSTViewer" | Particle : 86 Tupe : 22 PX = -3.403287 PY = 0.640492 PZ = 2.166717 P tot = 4.085004 Charge = 0.000000 F = 4.085004
 DEBUG "MyDSTViewer" | Low momentum particle given point instead of helix
 DEBUG3 "MyDSTViewer"] Particle : 87 Type : -211 PX = -1.878942 PY = 0.458797 PZ = 1.637429 P_tot = 2.534184 Charge = -1.000000 E = 2.538025
 DEBUGS "MuDSTViewer"] Particle : 88 Type : 22 PX = 0.057986 PY = 0.259758 PZ = 0.116865 P_tot = 0.290679 (harge = 0.000000 F = 0.290679
 DEBUG "MyDSTViewer" | Low momentum particle given point instead of helix
 MESSAGE "MuDSTViewer"]
 MESSAGE "MyDSTViewer"] Total Energy and Momentum Balance of Event
 MESSAGE "MyDSTViewer"] Energy = 449.246399 PX = -14.050469 PY = 5.846445 PZ = 59.123272 Charge = -3.000000
 MESSAGE "MuDSTViewer"]
 DEBUG2 "MyDSTViewer"] Setup properties
DEBUG2 "MuDSTViewer"] B_Field = 3.500000 T
 MESSAGE "MuDSIViewer" | Double click for picking, Press (ENIER) for the next event.
  D: Accepted connection from localhost
NFO: new client - socketID: 8
-III- · * * - - F1 + 7
                             Bot 136408 (Shell:run) ---
```

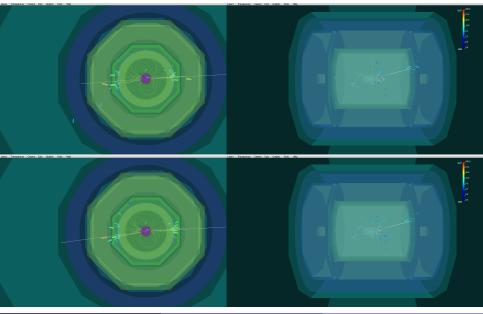
Event 1 (Same)



Event 1 (Same)

```
Applications Places System (1) 6 6 6 1
                                                                                                                                           DEBUG3 "MyDSTViewer"] Particle : 63 Type : -211 PX = -1.029530 PY = -0.309482 PZ = 0.449158 P_tot = 1.165098 Charge = -1.000000 E = 1.173428
 DEBUG3 "MyDSTViewer"] Particle: 64 Type: 22 PX = 0.130499 PY = -0.150732 PZ = -0.102972 P_tot = 0.224396 Charge = 0.000000 E = 0.224396
 DEBUG "MuDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MyDSTViewer"] Particle : 65 Type : 211 PX = 1.540614 PY = -0.374251 PZ = 2.322249 P_tot = 2.811831 Charge = 1.000000 E = 2.815293
 DEBUG3 "MuDSTViewer"] Particle : 66 Tupe : 22 PX = -0.386386 PY = -0.031225 PZ = -0.552136 P_tot = 0.674628 Charge = 0.000000 E = 0.674628
 DEBUG "MyDSTViewer" I Low momentum particle given point instead of helix
 DEBUG3 "MyDSTViewer"] Particle : 67 Type : 2112 PX = 10.632425 PY = 0.195657 PZ = 19.569725 P_tot = 22.272425 Charge = 0.000000 E = 22.272425
 DEBUG "MuDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MyDSTViewer"] Particle: 68 Type: -211 PX = -0.535791 PY = 0.190975 PZ = -1.519789 P_tot = 1.622745 Charge = -1.000000 E = 1.628736
 DEBUG3 "MyDSTViewer"] Particle : 69 Type : 22 PX = 1.977026 PY = -5.661902 PZ = 0.740025 P_tot = 6.042633 Charge = 0.000000 E = 6.042633
 DEBUG "MuDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MyDSTViewer" | Particle : 70 Type : 22 PX = 0.349822 PY = 0.187131 PZ = 0.756237 P_tot = 0.853983 Charge = 0.000000 E = 0.853983
 DEBUG "MyDSTViewer" | Low momentum particle given point instead of helix
 DEBUG3 "MuDSTViewer"] Particle : 71 Tupe : 2112 PX = 0.104198 PY = -0.158562 PZ = 1.266232 P_tot = 1.280368 Charge = 0.000000 E = 1.280368
 DEBUG "MyDSTViewer"] Low momentum particle given point instead of helix
 MESSAGE "MyDSTViewer"] Total Energy and Momentum Balance of Event
 MESSAGE "NuDSTViewer"] Energy = 499.843445 PX = 9.730580 PY = 1.531041 PZ = 10.408871 Charge = 1.000000
 MESSAGE "MyDSTViewer"]
 DEBUG2 "MyDSTViewer"] Setup properties
DEBUG2 "MyDSTViewer"] B_Field = 3.500000 T
  MESSAGE "MuDSTViewer"] Double click for picking. Press (ENTER) for the next event.
-UU-:**--F1 t6
                             Bot 136461 (Shell:run)
DEBUGG "MyDSTViewer") Particle : 64 Type : 310 PX = 9.920612 PY = -0.605116 PZ = 17.979019 P_tot = 20.543365 Charge = 0.000000 E = 20.574711 DEBUG "MyDSTViewer"] Unassigned type of colour: default
 DEBUG "MyDSTViewer" | Low momentum particle given point instead of helix
 DEBUG3 "MyDSTViewer"] Particle : 65 Type : 310 PX = -1.850127 PY = 0.227355 PZ = -3.079129 P_tot = 3.599402 Charge = 0.000000 E = 3.625079
DEBUG "MuDSTViewer"] Unassigned tupe of colour: default
 DEBUG "MGDIYLewer"] Low momentum particle given point instead of helix
DEBUG "MgDSIYLewer"] Particle : 66 Uppe : -211 PX = -0.218310 PY = -0.99320 PZ = -0.186797 P_tot = 0.295790 Charge = -1.000000 E = 0.327065
DEBUG "MgDSIYLewer"] Particle : 67 Uppe : -211 PX = 1.011289 PY = 0.651714 PZ = -0.979508 P_tot = 1.551397 Charge = -1.000000 E = 1.557662
 DEBUG3 "MyDSTViewer"] Particle : 68 Type : 2112 PX = 0.028631 PY = 0.001674 PZ = 0.442204 P_tot = 0.443133 Charge = 0.000000 E = 0.443133
 DEBUG "MuDSTViewer"] Low momentum particle given point instead of helix
 DEBUGS "MujDSTViewer"] Particle : 69 Type : 22 PX = 0.286302 PY = -0.082078 PZ = 0.184191 P_tot = 0.310648 Charge = 0.000000 E = 0.310648
 DEBUG "MyDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MuDSIViewer" | Particle : 70 Tupe : 22 PX = 0.130499 PY = -0.150732 PZ = -0.102972 P tot = 0.224396 Charge = 0.000000 E = 0.224396
 DEBUG "MyDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MaDSTViewer"] Particle : 71 Tupe : 211 PX = 0.101175 PY = -0.277650 PZ = 0.071388 P_tot = 0.304010 Charge = 1.000000 E = 0.334518
 MESSAGE "MuDSTViewer"]
 MESSAGE "MyDSTViewer"] Total Energy and Momentum Balance of Event
 MESSAGE "MuDSTViewer"] Energy = 499.843414 PX = 9.730568 PY = 1.531039 PZ = 10.408857 Charge = 1.000000
 MESSAGE "MyDSTViewer"]
 DEBUG2 "MyDSTViewer"] Setup properties
DEBUG2 "MuDSTViewer"] B_Field = 3.500000 T
 MESSAGE "MuDSTViewer" | Double click for picking. Press (ENTER) for the next event.
-UU-:**--F1 t7
                             Bot L36544 (Shell:run) -
```

Event 2 (Some Differences)



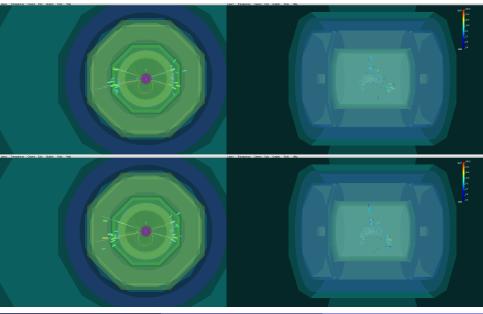
Event 2 (Some Differences)

```
Applications Places System (1) 6 6 6 1
                                                                                                                                           DEBUG3 "MyDSTViewer"] Particle : 94 Type : 3122 PX = -5.318065 PY = -0.307110 PZ = 1.427611 P_tot = 5.514908 Charge = 0.000000 E = 5.928513
  DEBUG "MyDSTViewer"] Unassigned type of colour: default
 DEBUG "MuDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MuDSTViewer" | Particle : 95 Tupe : 211 PX = 1.613314 PY = 0.340524 PZ = -0.791130 P tot = 1.828832 Charge = 1.000000 F = 1.834150
 DEBUG3 "MuDSTViewer"] Particle: 96 Tupe: 22 PX = 0.475111 PY = 0.147307 PZ = -0.251124 P_tot = 0.557220 Charge = 0.000000 E = 0.557220
 DEBUG "MyDSTViewer" I Low momentum particle given point instead of helix
 DEBUG3 "MyDSTViewer"1 Particle : 97 Type : -211 PX = 4.385795 PY = 0.038353 PZ = -2.870278 P_tot = 5.241676 Charge = -1.000000 E = 5.243534
  DEBUG3 "MuDSTViewer"] Particle : 98 Tupe : -211 PX = -1.632452 PY = 0.191914 PZ = 0.611496 P_tot = 1.753756 Charge = -1.000000 E = 1.759300
 DEBUG3 "MuDSTViewer"] Particle : 99 Type : -211 PX = -3.711717 PY = 0.462786 PZ = 0.748632 P_tot = 3.814638 Charge = -1.000000 E = 3.817191 DEBUG3 "MuDSTViewer"] Particle : 100 Type : -211 PX = 1.472372 PY = -0.252858 PZ = -0.814362 P_tot = 1.701471 Charge = -1.000000 E = 1.707185
 DEBUG3 "MuDSIViewer"] Particle: 101 Tupe: 22 PX = 3.849463 PY = -0.421575 PZ = -2.724746 P_tot = 4.735011 Charge = 0.000000 E = 4.735011
 DEBUG "MyDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MyDSTViewer" | Particle : 102 Type : 211 PX = 27.554861 PY = -4.617208 PZ = -0.048157 P_tot = 27.939064 Charge = 1.000000 E = 27.939413
 DEBUG3 "MuDSTViewer"] Particle : 103 Tupe : 22 PX = 0.393810 PY = 0.369808 PZ = 0.041350 P_tot = 0.541807 Charge = 0.000000 E = 0.541807
 DEBUG "MuDSTViewer" | Low momentum particle given point instead of helix
 MESSAGE "MyDSTViewer"] Total Energy and Momentum Balance of Event
 MESSAGE "NuDSTViewer"] Fnergu = 484,938354 PX = -19,863691 PY = 6,012734 PZ = -8,636895 Charge = 1,000000
  MESSAGE "MuDSTViewer"]
 DEBUG2 "MyDSTViewer"] Setup properties
DEBUG2 "MyDSTViewer"] B_Field = 3.500000 T
  MESSAGE "MuDSTViewer"] Double click for picking. Press <ENTER> for the next event.
-UU-:**--F1 t6
                             Bot L36646 (Shell:run)
DEBUG "MyDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MuDSIViewer" | Particle : 93 Type : 2112 PX = -3.989326 PY = 0.262861 PZ = 4.429727 P_tot = 5.967102 Charge = 0.000000 E = 5.967102
 DEBUG "MyDSTViewer" | Low momentum particle given point instead of helix
 DEBUG3 "MyDSTViewer"] Particle : 94 Type : 22 PX = -0.199190 PY = 0.008768 PZ = 0.052214 P_tot = 0.206106 Charge = 0.000000 E = 0.206106
DEBUG "MuDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MyDSTViewer"1 Particle : 95 Type : -211 PX = 0.318540 PY = 0.023642 PZ = -2.130152 P_tot = 2.213322 Charge = -1.000000 E = 2.217718 DEBUG3 "MyDSTViewer"1 Particle : 96 Type : -211 PX = -8.215693 PY = 0.748916 PZ = 1.416659 P_tot = 8.370509 Charge = -1.000000 E = 8.371673
 DEBUG3 "MuDSTViewer" | Particle : 97 Tupe : 211 PX = 1.090400 PY = -0.016476 PZ = -0.173584 P tot = 1.104253 Charge = 1.000000 E = 1.113038
 DEBUG3 "MuDSTViewer"] Particle: 98 Tupe: 22 PX = -6.808722 PY = 0.279713 PZ = 1.584417 P_tot = 6.996236 Charge = 0.000000 E = 6.996236
 DEBUG "MyDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MyDSTViewer"] Particle : 99 Type : 3122 PX = -5.314058 PY = -0.308168 PZ = 1.426535 P_tot = 5.510824 Charge = 0.000000 E = 5.924130
 DEBUG "MyDSTViewer" | Unassigned type of colour: default
 DEBUG "MuDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MyDSTViewer"] Particle: 100 Type: 22 PX = 1.289033 PY = 0.198287 PZ = -0.913313 P_tot = 1.592188 Charge = 0.000000 E = 1.592188
 DEBUG "MyDSTViewer"] Low momentum particle given point instead of helix
 MESSAGE "MuDSTViewer"]
 MESSAGE "MyDSTViewer"] Total Energy and Momentum Balance of Event
 MESSAGE "NuDSTViewer"] Energy = 513.243225 PX = 6.192719 PY = -0.111462 PZ = -10.381721 Charge = -2.000000
 MESSAGE "MyDSTViewer"]
 DEBUG2 "MyDSTViewer"] Setup properties
DEBUG2 "MuDSTViewer"] B_Field = 3.500000 T
 MESSAGE "MuDSTViewer" | Double click for picking. Press (ENTER) for the next event.
```

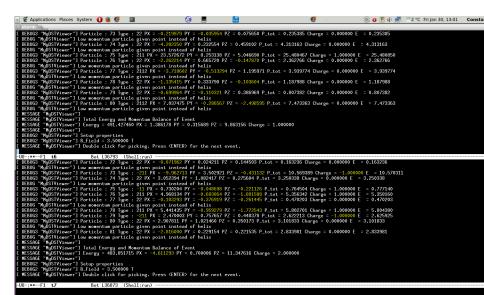
Bot L36723 (Shell:run) -

-III- · * * - - F1 + 7

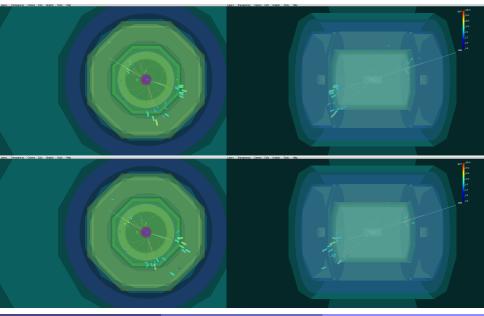
Event 3 (Some Differences)



Event 3 (Some Differences)



Event 4 (Some Differences)



Event 4 (Some Differences)

```
Applications Places System (1) 6 6 6 1
                                                                                                                                               DEBUG "MyDSTViewer"] Low momentum particle given point instead of helix
  DEBUG3 "MyDSTViewer"] Particle : 56 Type : 22 PX = -0.660311 PY = -1.828372 PZ = -1.976964 P_tot = 2.772606 Charge = 0.000000 E = 2.772606
 DEBUG "MuDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MyDSTViewer"] Particle: 57 Type: 2112 PX = -0.173058 PY = -0.033530 PZ = -0.250609 P_tot = 0.306395 Charge = 0.000000 E = 0.306395
 DEBUG "MuDSTViewer" | Low momentum particle given point instead of helix
 DEBUG3 "MuDSTViewer" | Particle : 58 Tupe : 22 PX = 0.034061 PY = 0.257718 PZ = 0.113766 P tot = 0.283763 Charge = 0.000000 E = 0.283763
 DEBUG "MyDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MuDSTViewer"] Particle : 59 Tupe : 211 PX = -0.659568 PY = -4.051832 PZ = -6.196676 P_tot = 7.433113 Charge = 1.000000 E = 7.434423
 DEBUG3 "MyDSTViewer" | Particle : 60 Type : -211 PX = 0.908488 PY = 0.872555 PZ = 0.427363 P_tot = 1.330166 Charge = -1.000000 E = 1.337468
 DEBUGS "MyDSYLewer"] Particle : 61 Type : 211 PX = -1.888277 PY = -4.19442 PZ = 6.593822 P. tot = 7.994314 Charge = 1.000000 E = 7.995533 DEBUGS "MyDSYLewer"] Particle : 62 Type : -211 PX = 0.113933 PY = -0.793389 PZ = -0.932789 P. tot = 1.239163 PL = 1.239163 DEBUGS "MyDSYLewer"] Particle : 63 Type : 22 PX = -0.043185 PY = -0.307117 PZ = -0.3313128 P. tot = 0.440721 Charge = 0.000000 E = 0.440721
 DEBUG "MyDSTViewer" | Low momentum particle given point instead of helix
 DEBUG3 "MuDSTViewer"] Particle : 64 Tupe : 2112 PX = 0.065277 PY = 0.003811 PZ = 1.018961 P_tot = 1.021056 Charge = 0.000000 E = 1.021057
 DEBUG "MyDSTViewer"] Low momentum particle given point instead of helix
 MESSAGE "MyDSTViewer"] Total Energy and Momentum Balance of Event
 MESSAGE "NuDSTViewer" | Fnergu = 469.750763 PX = -1.963846 PY = -10.831343 PZ = 12.248179 Charge = 0.000000
 MESSAGE "MyDSTViewer"]
 DEBUG2 "MyDSTViewer"] Setup properties
DEBUG2 "MyDSTViewer"] B_Field = 3.500000 T
 MESSAGE "MuDSTViewer" | Double click for picking. Press (ENTER) for the next event.
-UU-:**--F1 t6
                              Bot 136911 (Shell:run)
[ DEBUG3 "MyDSTViewer"] Particle : 61 Type : -211 PX = -10.080924 PY = -2.901120 PZ = -11.373954 P_tot = 15.472826 Charge = -1.000000 E = 15.473455
 DEBUG3 "MyDSTViewer"] Particle : 62 Type : 22 PX = 0.301414 PY = 1.291520 PZ = 0.271147 P_tot = 1.353660 Charge = 0.000000 E = 1.353660
 DEBUG "MyDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MuDSTViewer"] Particle: 63 Tupe: 22 PX = -8.490582 PY = -2.417883 PZ = -9.663867 P_tot = 13.089174 Charge = 0.000000 E = 13.089175
DEBUG "MuDSIViewer" | Low momentum particle given point instead of helix
 DEBUG3 "MgDSTViewer"] Particle : 64 Type : 211 PX = -0.380224 PY = 0.676925 PZ = 1.097979 P_tot = 1.344751 Charge = 1.000000 E = 1.351975
 DEBUG3 "MyDSTViewer"] Particle : 65 Type : 211 PX = -0.031340 PY = 0.183572 PZ = -0.182669 P_tot = 0.260861 Charge = 1.000000 E = 0.295852
 DEBUG3 "MuDSTViewer" | Particle : 66 Tupe : 22 PX = -3.140560 PY = -0.792623 PZ = -3.011551 P tot = 4.422760 Charge = 0.000000 E = 4.422760
 DEBUG "MyDSTViewer" | Low momentum particle given point instead of helix
 DEBUG3 "MuDSTViewer"] Particle : 67 Tupe : 2112 PX = 1.015012 PY = 1.399377 PZ = 0.576219 P_tot = 1.822233 Charge = 0.000000 E = 1.822233
 DEBUG "MyDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MyDSTViewer"] Particle: 88 Type: 211 PX = 1.216624 PY = -5.026414 PZ = -5.737207 P_tot = 7.724025 Charge = 1.000000 E = 7.725286
DEBUG3 "MyDSTViewer"] Particle: 69 Type: 22 PX = -1.193770 PY = -0.260345 PZ = -1.314567 P_tot = 1.794701 Charge = 0.000000 E = 1.794701
 DEBUG "MyDSTViewer"] Low momentum particle given point instead of helix
 DEBUG3 "MuDSTViewer"] Particle: 70 Tupe: -211 PX = -12.298915 PY = -3.572956 PZ = -14.886720 P_tot = 19.637814 Charge = -1.000000 E = 19.638309
 MESSAGE "MuDSTViewer"]
 MESSAGE "MyDSTViewer"] Total Energy and Momentum Balance of Event
 MESSAGE "NuDSTViewer"] Energy = 475,366089 PX = -15,440767 PY = -17,675264 PZ = -6,678852 Charge = -1,000000
 MESSAGE "MyDSTViewer"]
 DEBUG2 "MyDSTViewer"] Setup properties
DEBUG2 "MuDSTViewer"] B_Field = 3.500000 T
 MESSAGE "MuDSTViewer" | Double click for picking. Press (ENTER) for the next event.
-III--××---F1 +7
                              Bot L37003 (Shell:run) -
```