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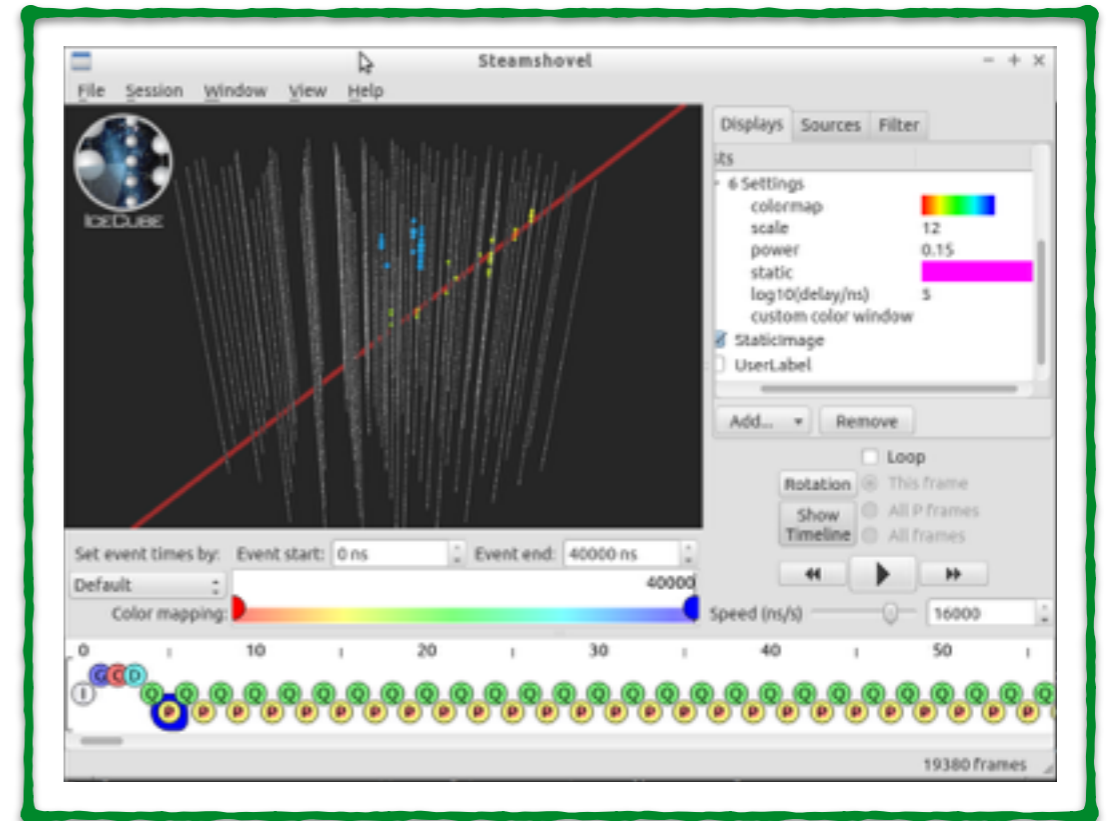
Visualizing 13 Files

An interactive tour of steamshovel and datio-pyshovel



Visualizing I3Files

- All data from IceCube physics runs and official simulations are stored in the .i3 file format
- Data in I3 files are commonly viewed in 3 different ways
 - **Steamshovel**: GUI for seeing events develop over time in IceCube (and IceTop)
 - **Dataio-pyshovel**: TUI for easy reading of stored information frame-by-frame
 - **ipython**: useful for finding out what you can do with objects in the frame, and that what you do does what you expect



```
Shoveling through file Level2_nugen_sums_iC86.2011.01118 For help press h
Frame 3: Physics
Key:                               Type:                               Contains:                               Bytes:
AtmCscdEnergyReco                  I3Particle                           icecube.dataclasses.I3Particle object 150
AtmCscdEnergyRecoParams             I3Particle                           (unreadable)                            143
CascadeDipoleFit                    I3Particle                           icecube.dataclasses.I3Particle object 150
CascadeDipoleFitParams              I3DipoleFitParams                    icecube.reclclasses.I3DipoleFitParams ... 93
CascadeFillRatio                    I3FillInfo                             icecube.reclclasses.I3FillInfo ob... 151
CascadeFillCscdLh                   I3PObHolder-double>                 icecube.dataclasses.I3Double object 36
CascadeImprovedLineFit              I3Particle                           icecube.dataclasses.I3Particle object 150
CascadeImprovedLineFitParams         I3LineFitParams                      icecube.reclclasses.I3LineFitParams ob... 71
CascadeLast                          I3Particle                           icecube.dataclasses.I3Particle object 150
CascadeLastParams                   I3LastFitParams                      icecube.reclclasses.I3LastFitParams o... 60
CascadeLineFit                       I3Particle                           icecube.dataclasses.I3Particle object 150
CascadeLineFitParams                 I3LineFitParams                      icecube.reclclasses.I3LineFitParams ob... 71
CascadeLineFitSplit1                I3Particle                           icecube.dataclasses.I3Particle object 150
CascadeLineFitSplit1Params           I3LineFitParams                      icecube.reclclasses.I3LineFitParams ob... 71
CascadeLineFitSplit2                I3Particle                           icecube.dataclasses.I3Particle object 150
CascadeLineFitSplit2Params           I3LineFitParams                      icecube.reclclasses.I3LineFitParams ob... 71
CascadeLhVertexFit                  I3Particle                           icecube.dataclasses.I3Particle object 150
CascadeLhVertexFitParams             I3CscdLhFitParams                   icecube.reclclasses.I3CscdLhFitParams... 126
CascadeSplitPulses1                  I3RecoPulseSeriesMapMask            Iterable with 7 items                    111
CascadeSplitPulses2                  I3RecoPulseSeriesMapMask            Iterable with 6 items                    107
CascadeToISplit1                    I3Particle                           icecube.dataclasses.I3Particle object 150
CascadeToISplit1Params               I3TensorOfInertiaFitParams          icecube.reclclasses.I3TensorOfInertiaF... 78
CascadeToISplit2                    I3Particle                           icecube.dataclasses.I3Particle object 150
CascadeToISplit2Params               I3TensorOfInertiaFitParams          icecube.reclclasses.I3TensorOfInertiaF... 78
CleanTriggerHierarchy_IT             I3Tree-I3Trigger>                   Iterable with 1 items                    92
ClusterCleaningExcludedStat...      I3Vector<int>                         Iterable with 0 items                    35
CorsikaWeightMap                     I3Map<string, double>                 Iterable with 14 items                   376
FilterMask                           I3Map<string, I3FilterResult>        Iterable with 26 items                   860

Key: 7/75      Rus/Subran: 1118400000/0      Start Time: 2011-01-01 00:28:20 UTC
Frame: 4/unk   Event/SubEvent: 17/in_ice
Stop: Physics  Duration: 16501 ns
scroll: 6 Top
```

How to View Events in Steamshovel

- To start up Steamshovel:

1. Enter an IceTray environment

on the VM enter: `~/i3_software/combo/build/env-shell.sh`

2. Use this syntax on the command line:

`steamshovel GCD-File.i3(.gz) Data-File.i3(.gz)`

How to View Events in Steamshovel

- Relevant Frame Types in i3 Files
 - G (geometry) frames hold information about the IceCube geometry such as DOM positions.
 - Q (short for DAQ, or data acquisition) frames hold data for a particular event window. This includes triggers, filters, and uncleaned pulses.
 - P (physics) frames hold all processing information. Reconstructions and pulse cleanings exist in these frames. There may be multiple P frames to one Q frame.

How to View Events in dataio-pyshovel

- To start up dataio-pyshovel:

1. Enter an IceTray environment

on the VM enter: `~/i3_software/combo/build/env-shell.sh`

2. Use this syntax on the command line:

`dataio-pyshovel Data-File.i3(.gz)`

How to View Events in dataio-pyshovel

- Some useful commands
 - *x* to open a module to read in XML format, or
 - *enter* to open a module to read in a cleaned, human-readable format
 - *g* to get a prompt to enter the frame number you wish to go to
 - *i* to enter an ipython shell
 - *L* to import a library
 - *h* for a list of command options

Useful Links

- Steamshovel Documentation:
 - http://software.icecube.wisc.edu/offline_trunk/projects/steamshovel/index.html