

# I3File Tools and Visualization

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IceCube Bootcamp

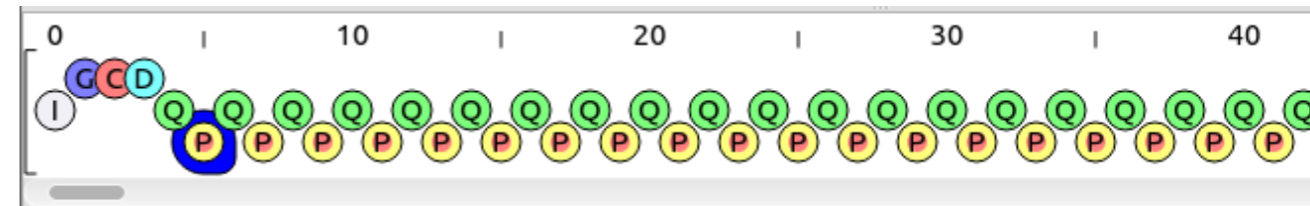


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# Different types of frames

Frames are Identified by a letter



Metadata (usually once per file)

- “I” (TrayInfo): Information on how the file was previously processed
- “G” (Geometry): Geometric coordinates of each DOM
- “C” (Calibration): Calibration constants relating to the photomultiplier tubes
- “D” (Detector Status): How the data acquisition system was configured for this particular (8 hour) run. I.e which DOMs were on.

Event Info: ( ~10 us of data)

- “Q” (DAQ): Waveforms recorded for this event
- “P” (Physics): High level pulse information and reconstructions

# Dataio-shovel

- Tool for easily viewing .i3 files in terminal
- Can be run on remote machines (such as cobalts)

```
icecube@M16: ~/i3/data/IC86-2011_nugen_numu
File Edit Tabs Help
Shoveling through file Level2_nugen_numu_IC86.2011.01118 For help press h
Frame 3: Physics
Key: Type: Contains: Bytes:
AtmCscdEnergyReco I3Particle icecube.dataclasses.I3Particle object 150
AtmCscdEnergyRecoParams AtmCscdEnergyRecoParams (Unreadable) 143
CascadeDipoleFit I3Particle icecube.dataclasses.I3Particle object 150
CascadeDipoleFitParams I3DipoleFitParams icecube.recclasses.I3DipoleFitParams ... 93
CascadeFillRatio I3FillRatioInfo icecube.recclasses.I3FillRatioInfo ob... 151
CascadeFilt_CscdLlh I3PODHolder<double> icecube.dataclasses.I3Double object 36
CascadeImprovedLineFit I3Particle icecube.dataclasses.I3Particle object 150
CascadeImprovedLineFitParams I3LineFitParams icecube.recclasses.I3LineFitParams ob... 71
CascadeLast I3Particle icecube.dataclasses.I3Particle object 150
CascadeLastParams I3CLastFitParams icecube.recclasses.I3CLastFitParams o... 68
CascadeLineFit I3Particle icecube.dataclasses.I3Particle object 150
CascadeLineFitParams I3LineFitParams icecube.recclasses.I3LineFitParams ob... 71
CascadeLineFitSplit1 I3Particle icecube.dataclasses.I3Particle object 150
CascadeLineFitSplit1Params I3LineFitParams icecube.recclasses.I3LineFitParams ob... 71
CascadeLineFitSplit2 I3Particle icecube.dataclasses.I3Particle object 150
CascadeLineFitSplit2Params I3LineFitParams icecube.recclasses.I3LineFitParams ob... 71
CascadeLlhVertexFit I3Particle icecube.dataclasses.I3Particle object 150
CascadeLlhVertexFitParams I3CscdLlhFitParams icecube.recclasses.I3CscdLlhFitParams... 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.recclasses.I3TensorOfInertiaF... 78
CascadeToISplit2 I3Particle icecube.dataclasses.I3Particle object 150
CascadeToISplit2Params I3TensorOfInertiaFitParams icecube.recclasses.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 Run/Subrun: 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
```

## To Use

1. First enter the IceTray environment:

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

2. For a file in .i3 format

on the VM: `dataio-shovel GCD-File.i3[.zst] Data.i3[.zst]`

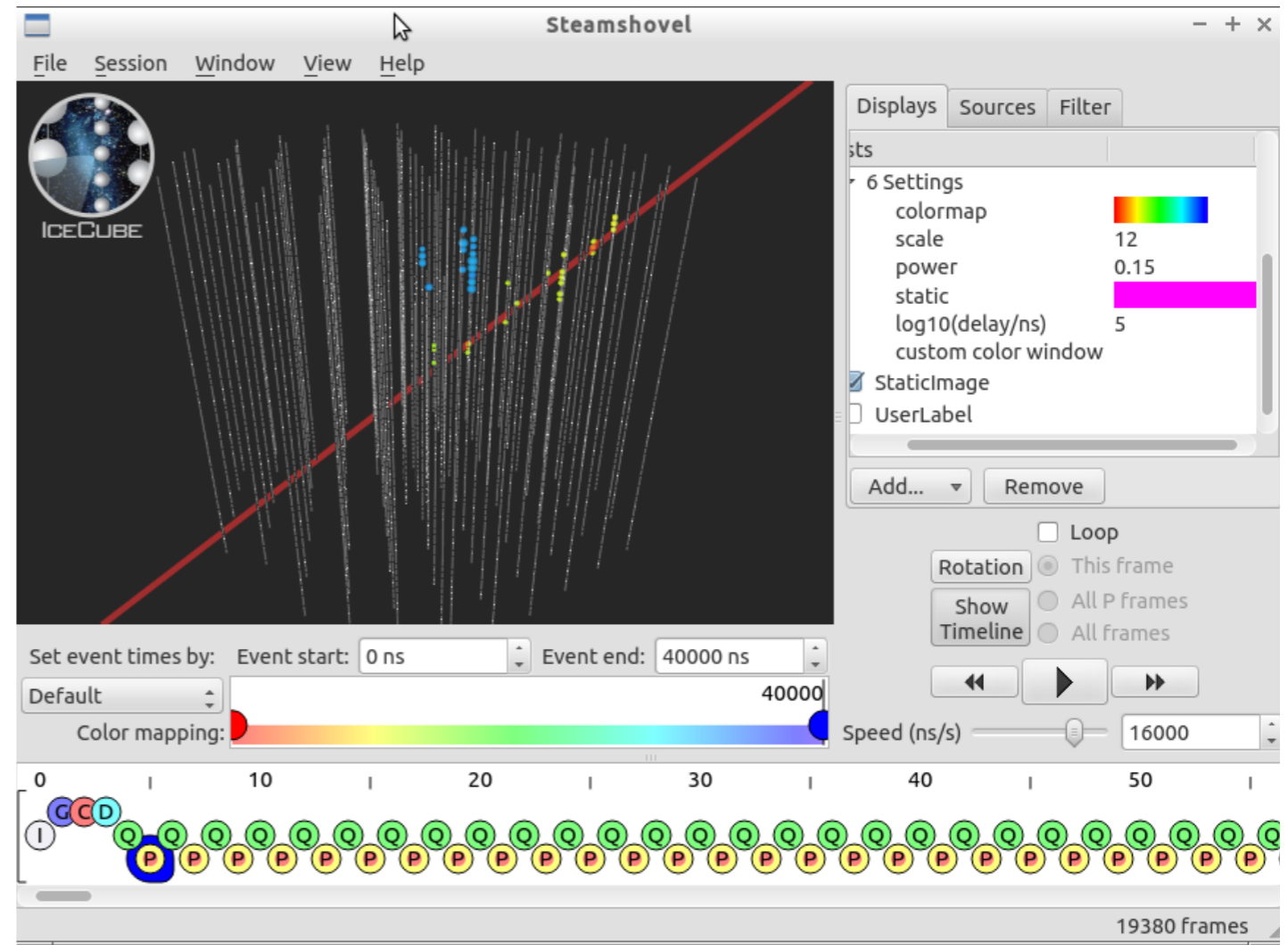
# Useful commands In dataio-shovel

- “x”: open a module in XML format
- “enter”: open an object in a cleaned human readable format
- “g”: goto a frame number
- “i”: enter an python shell
- “L”: import a library
- “?”: show all available commands

# dataio-shovel Demo

# Steamshovel

Tool for 3D visualization of IceCube events in a GUI



To Use

1. First enter the IceTray environment:

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

2. For a file in .i3 format

on the VM: `steamshovel GCD-File.i3[.zst] Data.i3[.zst]`

steamshovel documentation:

[https://docs.icecube.aq/icetray/main/projects/steamshovel/  
index.html](https://docs.icecube.aq/icetray/main/projects/steamshovel/index.html)



# Steamshovel Demo

Don't Suffer in silence, if you have any problems with Steamshovel or dataio-shovel do one of the following thing:

- File a issue on GitHub: <https://github.com/icecube/icetray/issues>
- Ask on #Software on Slack
- Send an email to [software@icecube.wisc.edu](mailto:software@icecube.wisc.edu)