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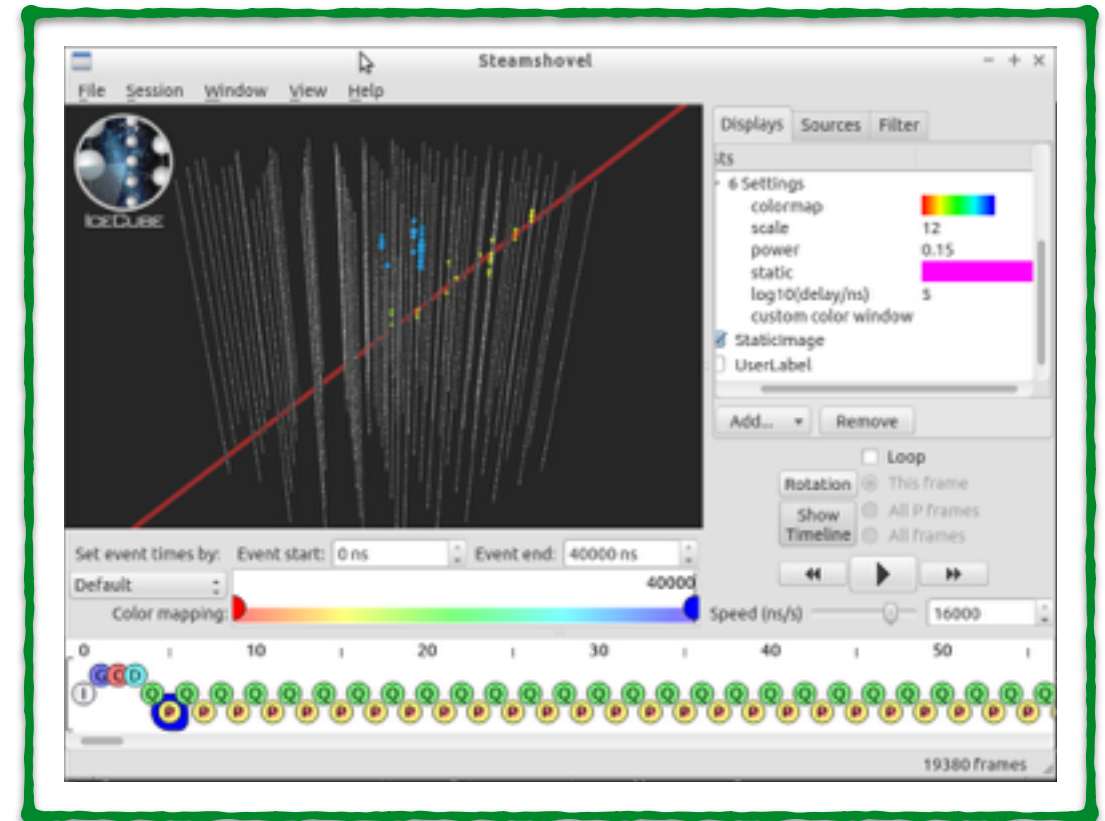
# Visualizing I3 Files

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

Frame 3: Physics

Key:	Type:	Contains:	Bytes:
AtmCsdEnergyReco	I3Particle	icecube.dataclasses.I3Particle object	150
AtmCsdEnergyRecoParams	AtmCsdEnergyRecoParams	(unreadable)	143
CascadeDipoleFit	I3Particle	icecube.dataclasses.I3Particle object	150
CascadeDipoleFitParams	I3DipoleFitParams	icecube.recclasses.I3DipoleFitParams ob...	93
CascadeFillRatio	I3FillRatioInfo	icecube.recclasses.I3FillRatioInfo ob...	151
CascadeFit_Cascade	I3P0Holder-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	I3LastFitParams	icecube.recclasses.I3LastFitParams ob...	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
CascadeLHVertexFit	I3Particle	icecube.dataclasses.I3Particle object	150
CascadeLHVertexFitParams	I3CsdLHFitParams	icecube.recclasses.I3CsdLHFitParams...	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: 0 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](http://software.icecube.wisc.edu/offline_trunk/projects/steamshovel/index.html)