First Look at Week 1

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Flavour Tagging Algorithm Meeting
28/05/15

Aims

- First data available in Week 1 (Next Week!)

- We want to look at this data and see if the b-Tagging variables are performing as expected.

Process

- Valerio Produces NTuples using Run2BtagOptimisationFramework.

- I have code that reads the NTuples and fills histograms with quantities from the NTuples.

- Code takes ~10 mins to run over NTuples.

Samples and Cuts

Samples

```
user.vdao.mc15_13TeV.*.Pythia8EvtGen_jetjet_JZ*W
.merge.AOD.*.BTAGNTUP_OrigV5slim_BTAGSTREAM/
```

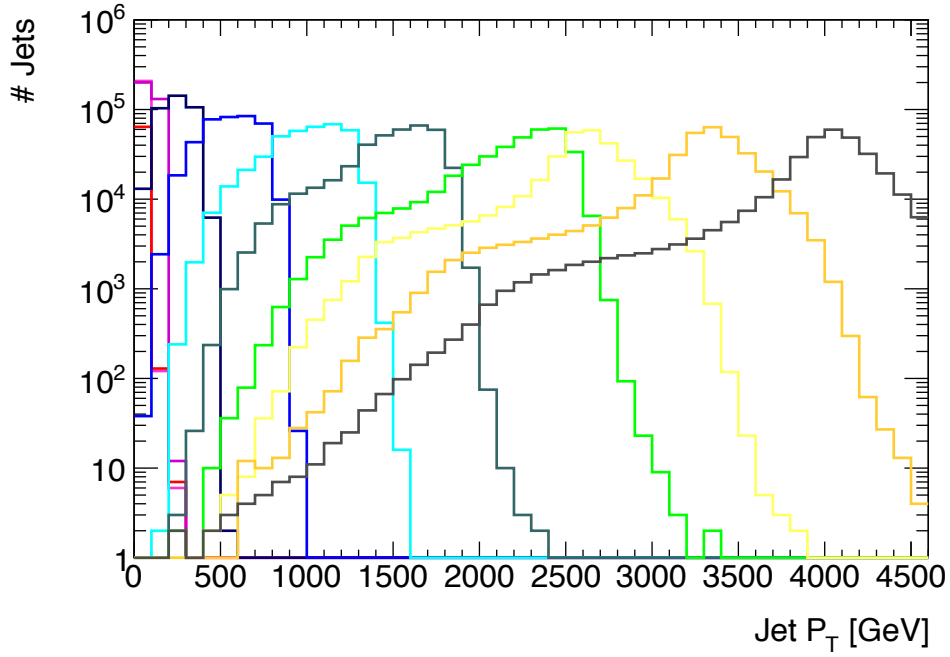
- A week 1 dijet sample for comparison to data.
- 2,161,636 split into 10 JZ slices each containing ~200,000 events.
- JZ slices must be re-weighted to get smooth jet-P_T spectrum.

Details/Cuts

- $20 < P_T < 4600$ GeV
- Leading and Sub-Leading Jet Only
- |eta| < 2.5
- JVT > 0.941
- njets ≥ 2

- LabDr_HadF matching

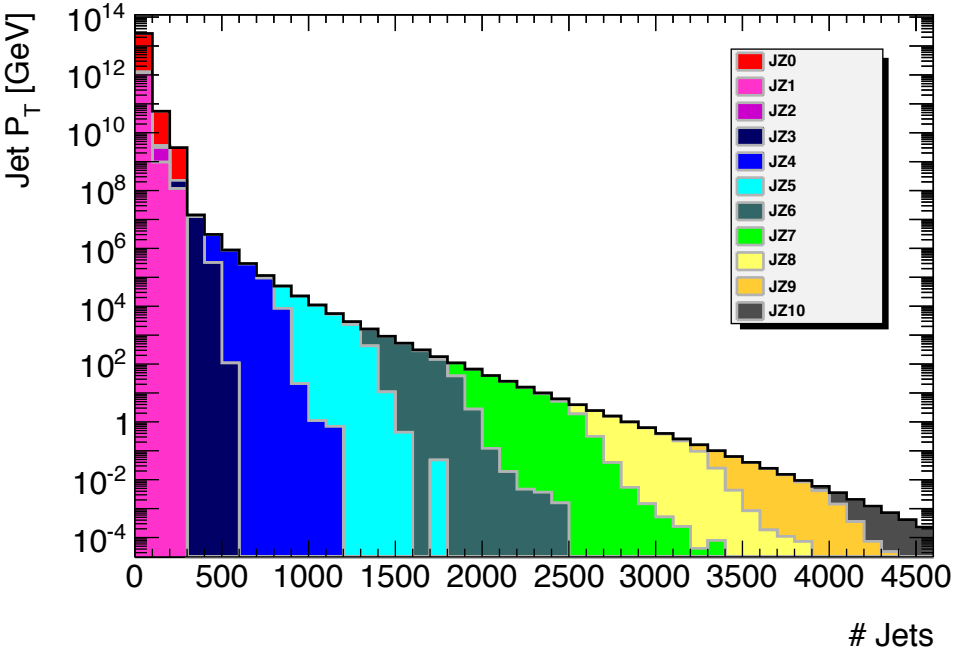
Di-jet sample re-weighting

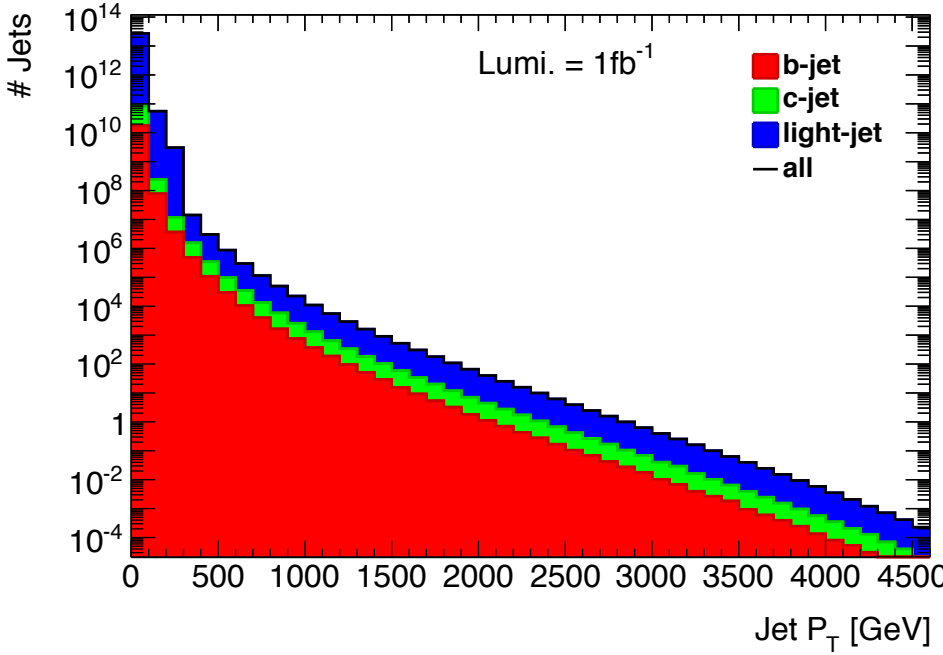


user.vdao.mc15_13TeV.*.Pythia8EvtGen_jetjet_JZ*W.merge.AOD.*.BTAGNTUP_OrigV5slim_BTAGSTREAM/

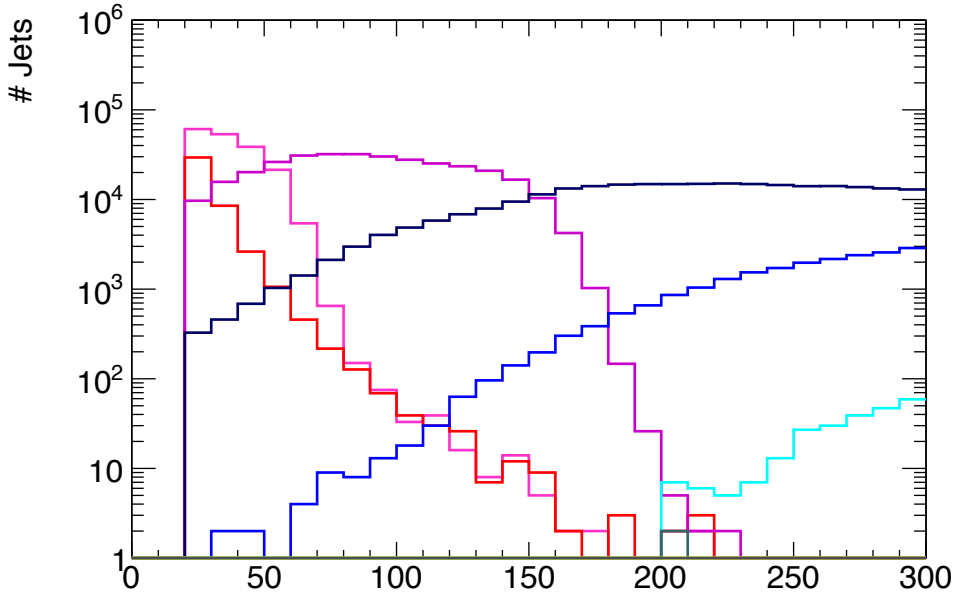
Total Weight = ***mcwg*(Filter Eff.)*(CS[fb])*(Lumi[fb^{-1}])*** / ***(# Events)***

Xs (fb)	Eff.	Slice and Energy
7.8420E+13	1.0240E+00	#JZ0W 0-20 GeV
7.8420E+13	6.7198E-04	#JZ1W 20-60 GeV
2.4334E+12	3.3264E-04	#JZ2W 60-160 GeV
2.6454E+10	3.1953E-04	#JZ3W 160-400 GeV
2.5464E+08	5.3009E-04	#JZ4W 400-800 GeV
4.5536E+06	9.2325E-04	#JZ5W 800-1300 GeV
2.5752E+05	9.4016E-04	#JZ6W 1300-1800 GeV
1.6214E+04	3.9282E-04	#JZ7W 1800-2500 GeV
6.2505E+02	1.0162E-02	#JZ8W 2500-3200 GeV
1.9640E+01	1.2054E-02	#JZ9W 3200-3900 GeV
1.1961E+00	5.8935E-03	#JZ10W 3900-4600 GeV
4.2260E-02	2.7015E-03	#JZ11W 4600-5300 GeV
1.0370E-03	4.2502E-04	#JZ12W 5300-7000 GeV



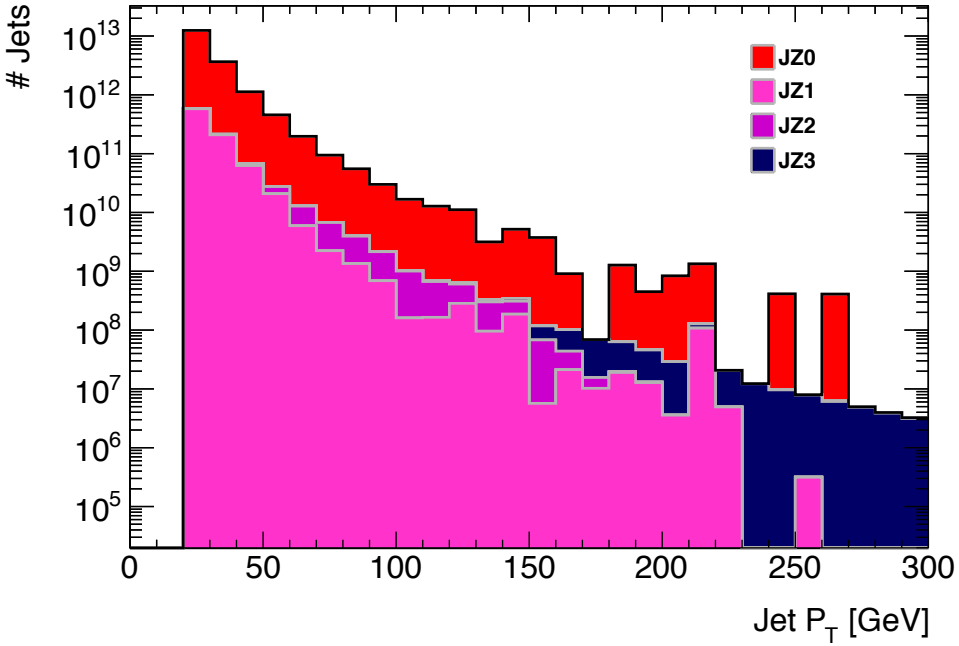


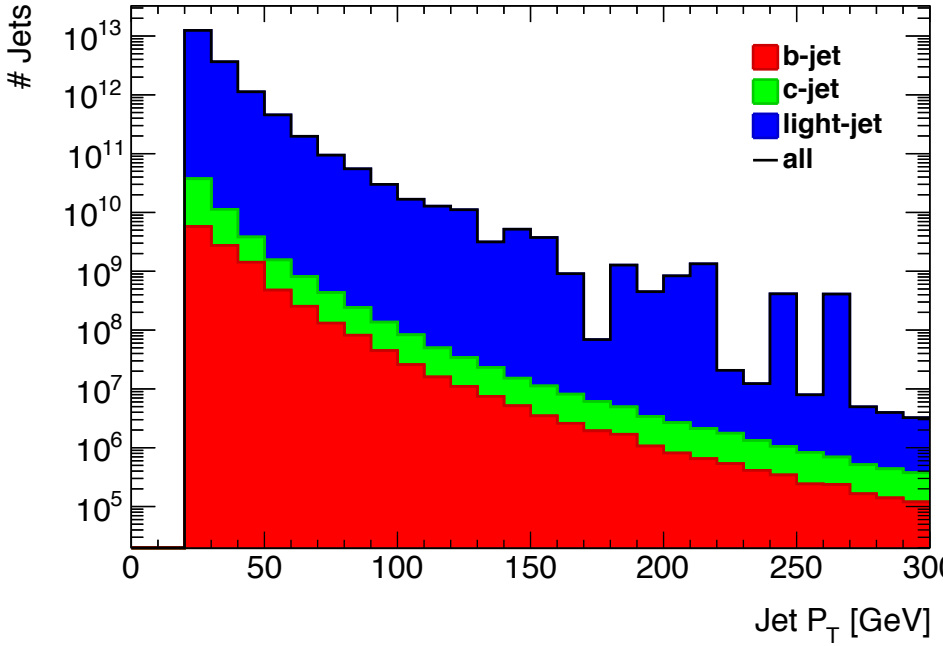
Di-jet sample re-weighting - Zoom In



Jet P_T = 20-300 GeV

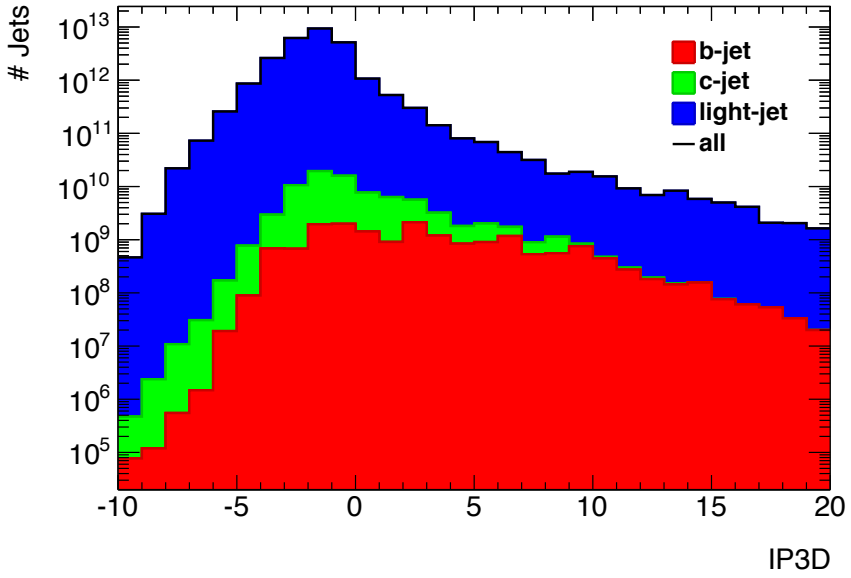
Xs (fb)	Eff.	Slice and Energy
7.8420E+13	1.0240E+00	#JZ0W 0-20 GeV
7.8420E+13	6.7198E-04	#JZ1W 20-60 GeV
2.4334E+12	3.3264E-04	#JZ2W 60-160 GeV
2.6454E+10	3.1953E-04	#JZ3W 160-400 GeV
2.5464E+08	5.3009E-04	#JZ4W 400-800 GeV

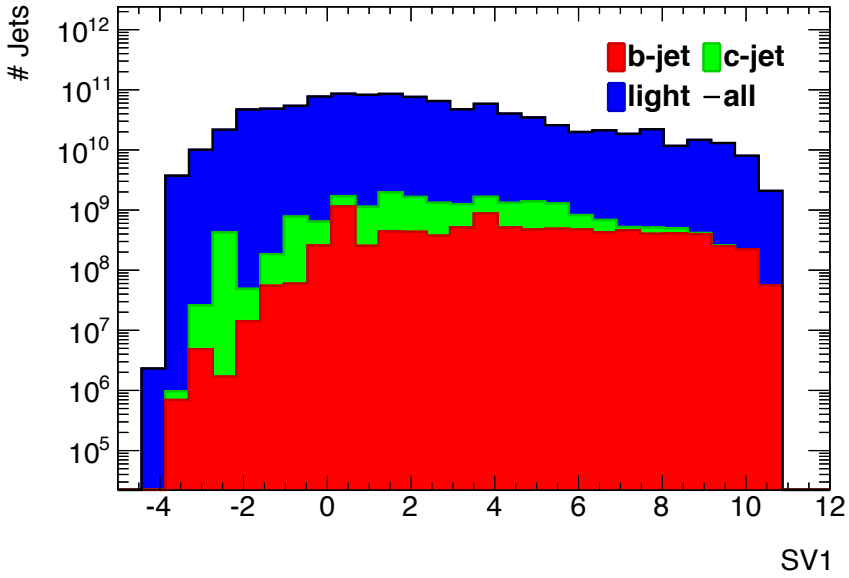


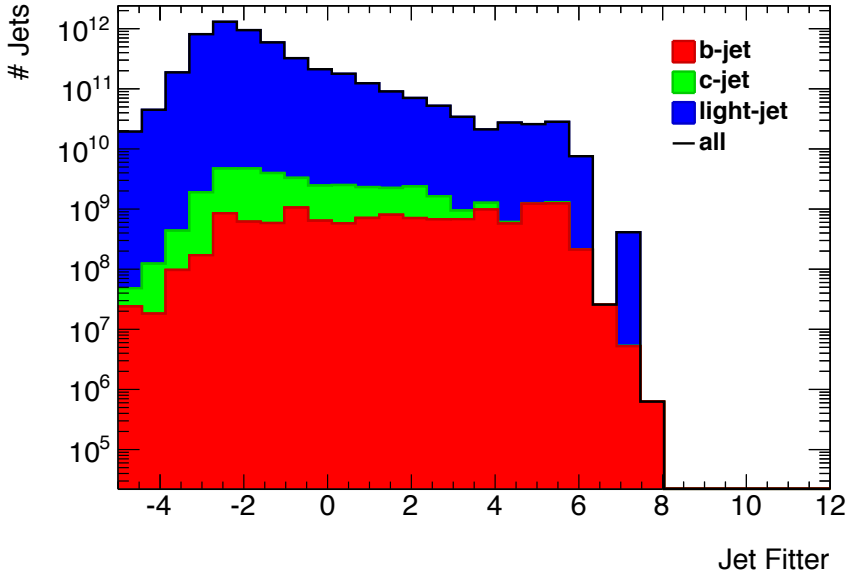


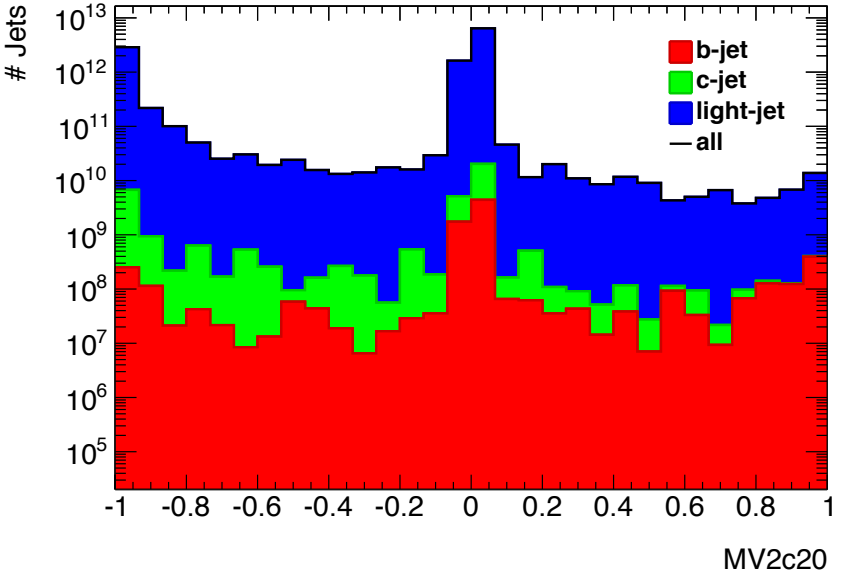
Discriminant Stack - Full P_T Range

P_T Range = 20-4600 GeV



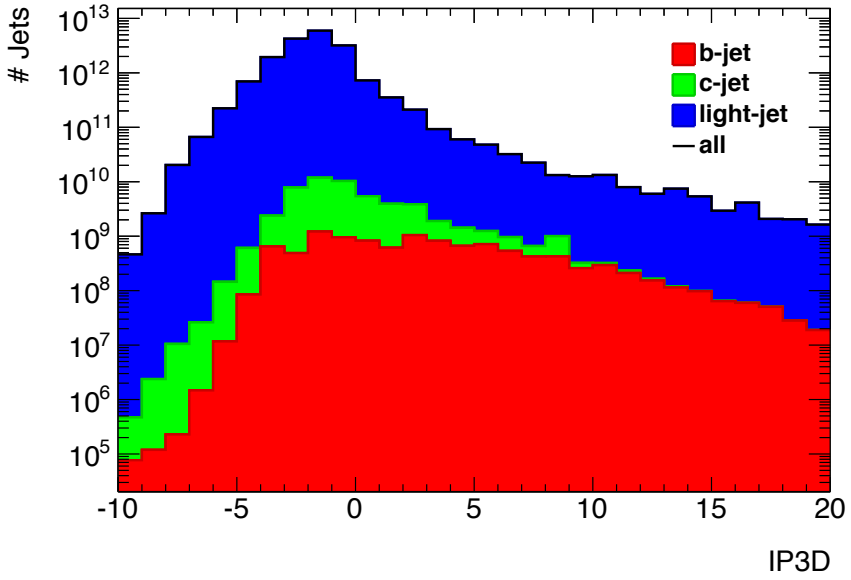


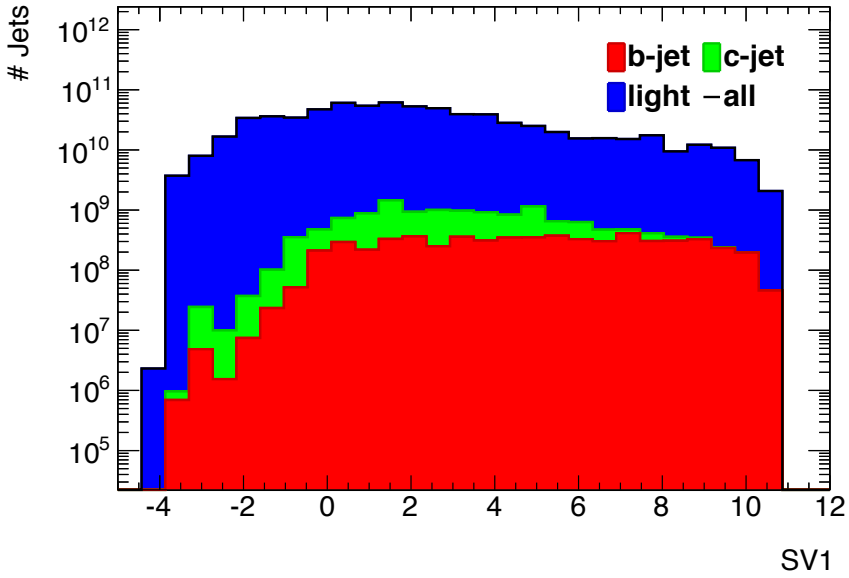


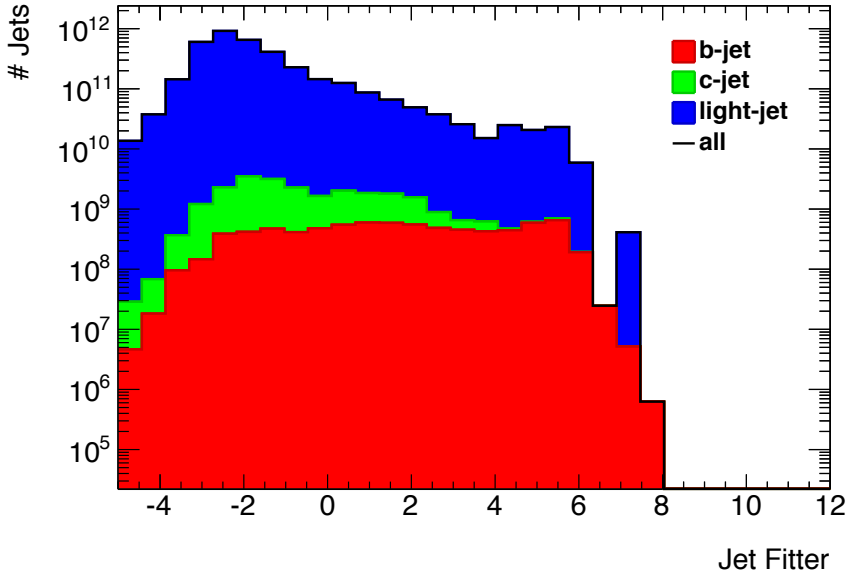


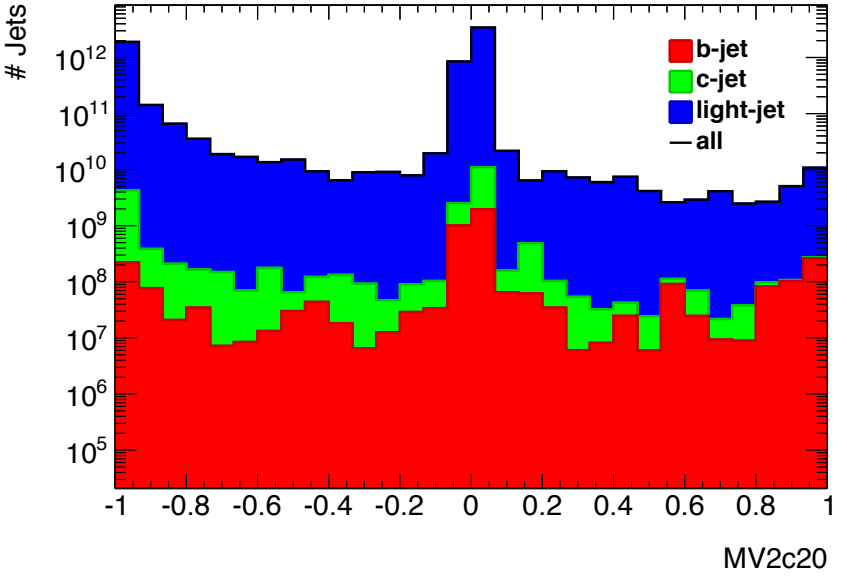
Discriminant Stack - 20 < P_T < 300 GeV

P_T Range = 20-300 GeV



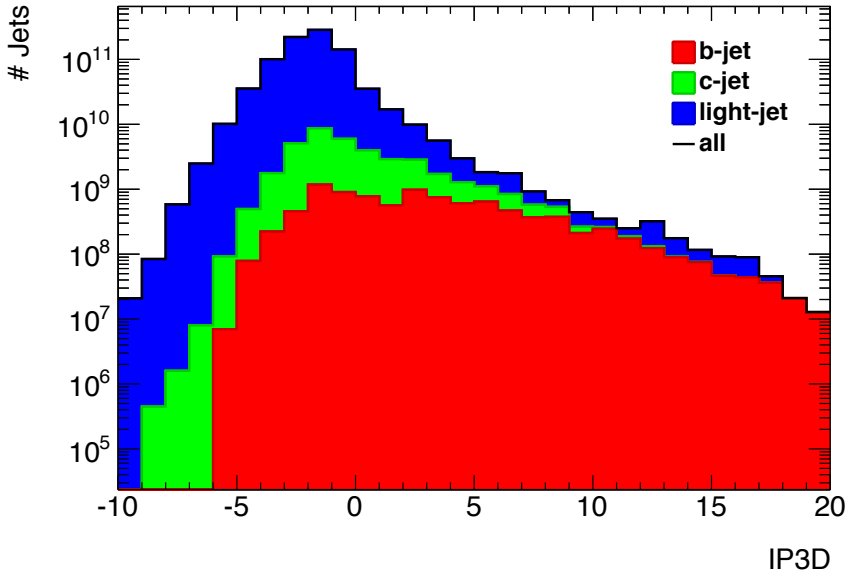


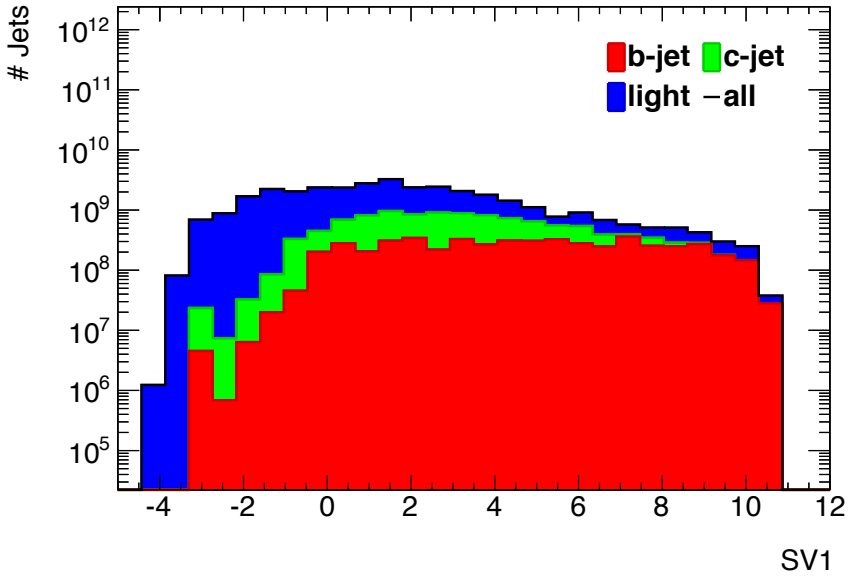


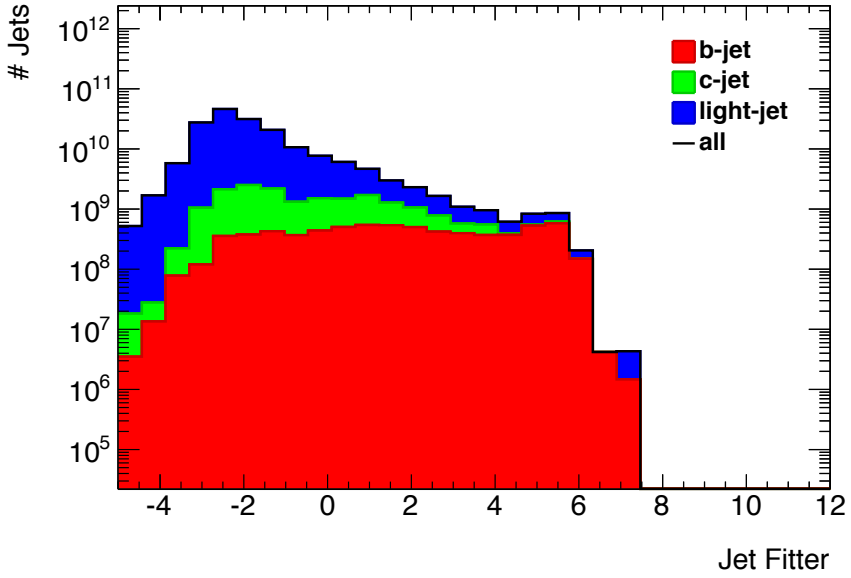


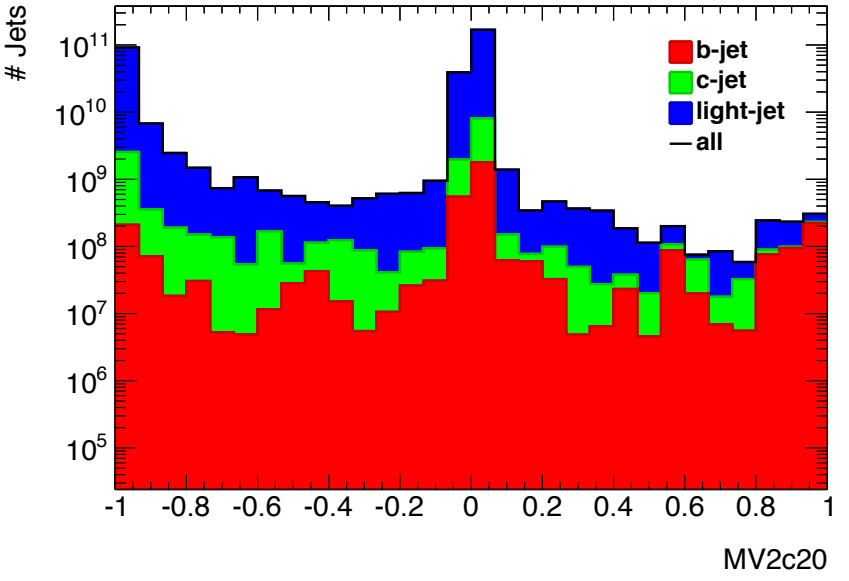
Discriminant Stack - JZ1W

JZ1W - 20-60 GeV



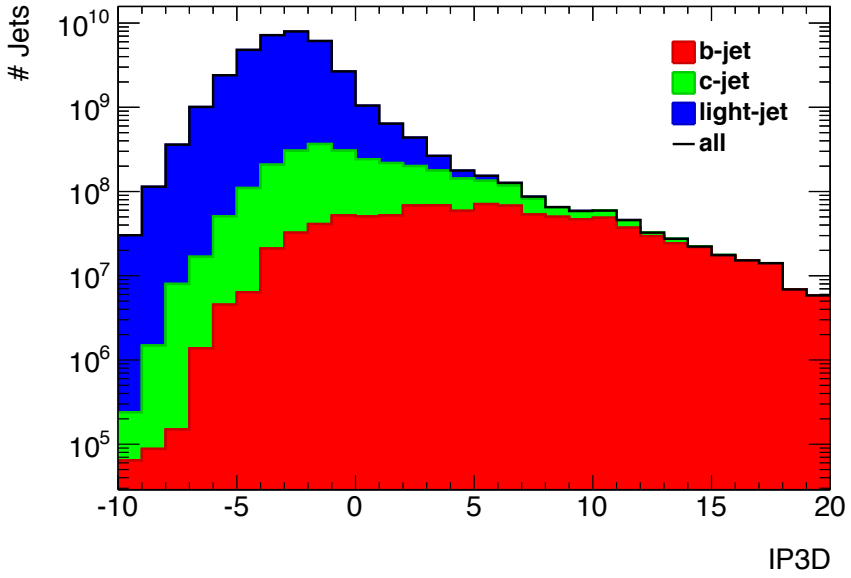


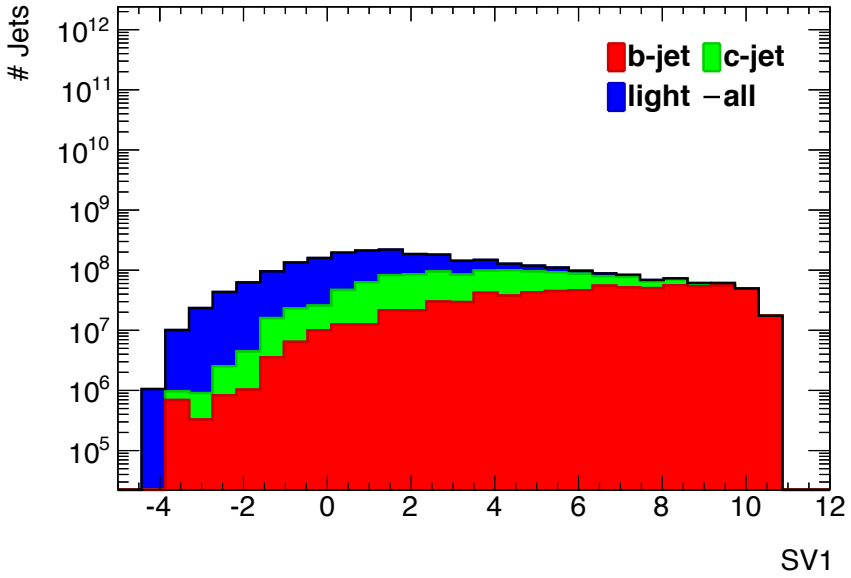


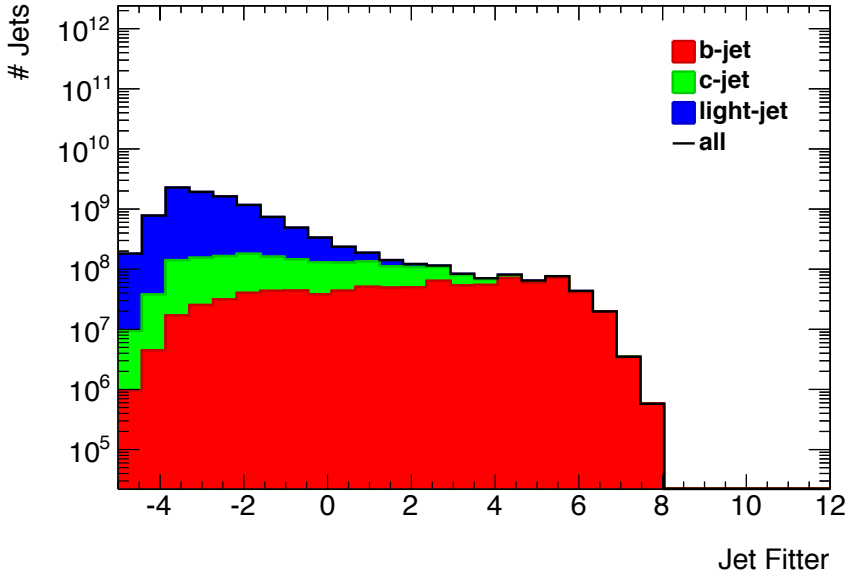


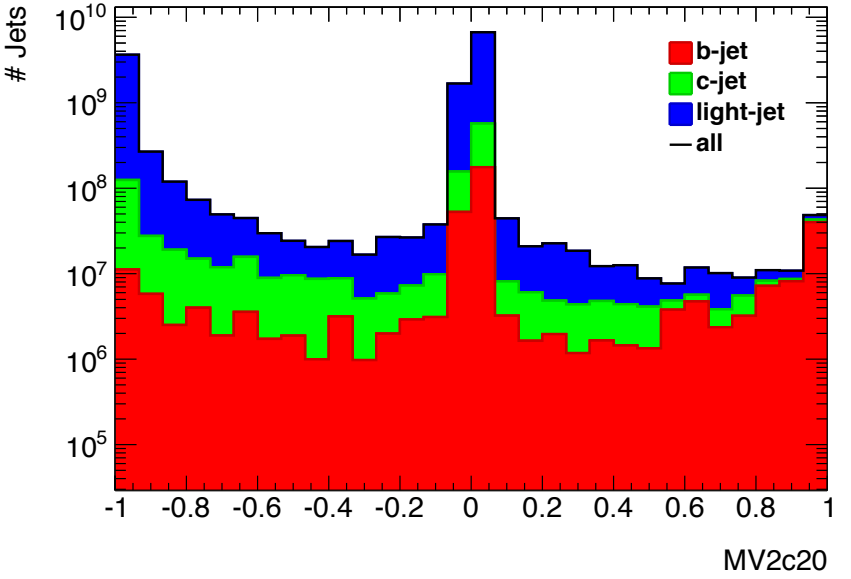
Discriminant Stack - JZ2W

JZ2W - 60-160 GeV

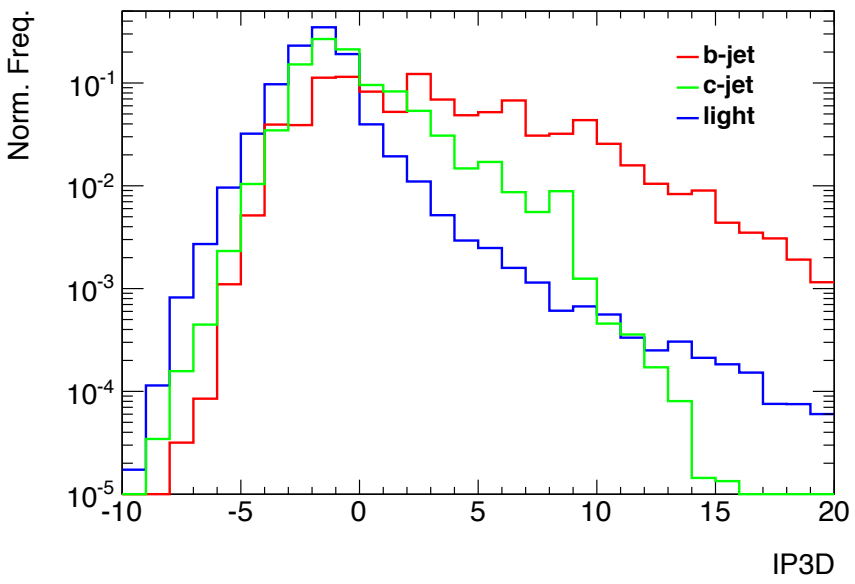


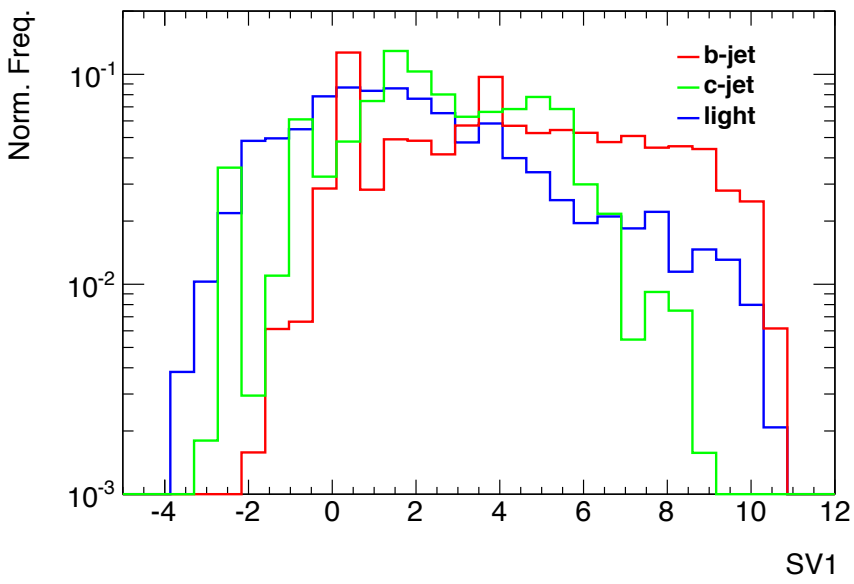


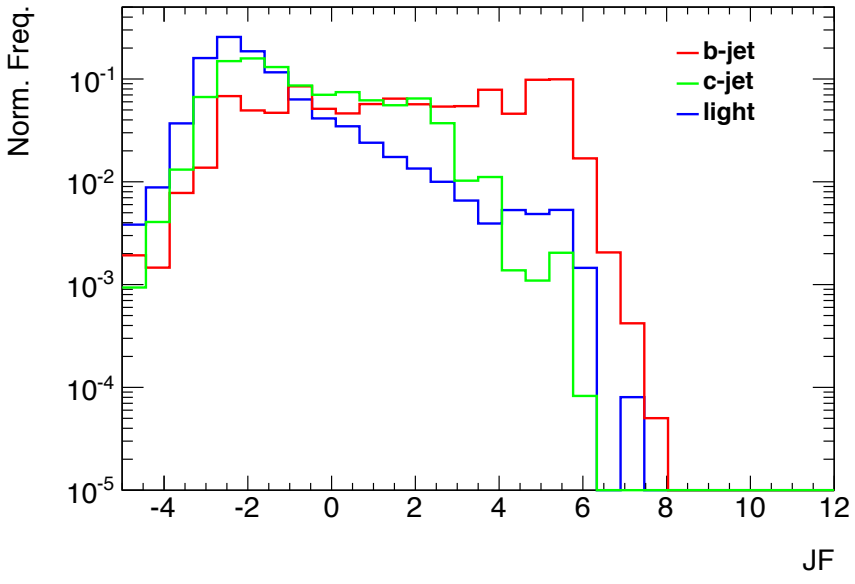


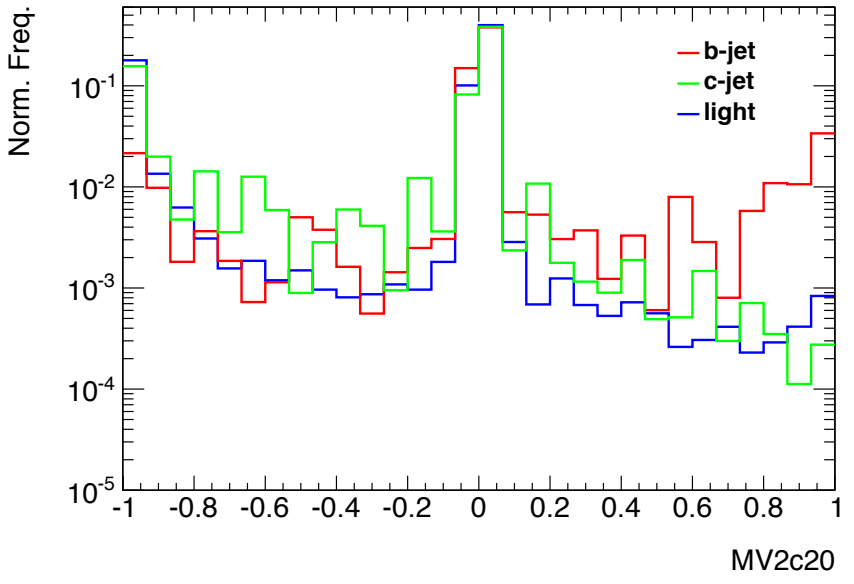


Normalised Discriminants - Full P_T Range



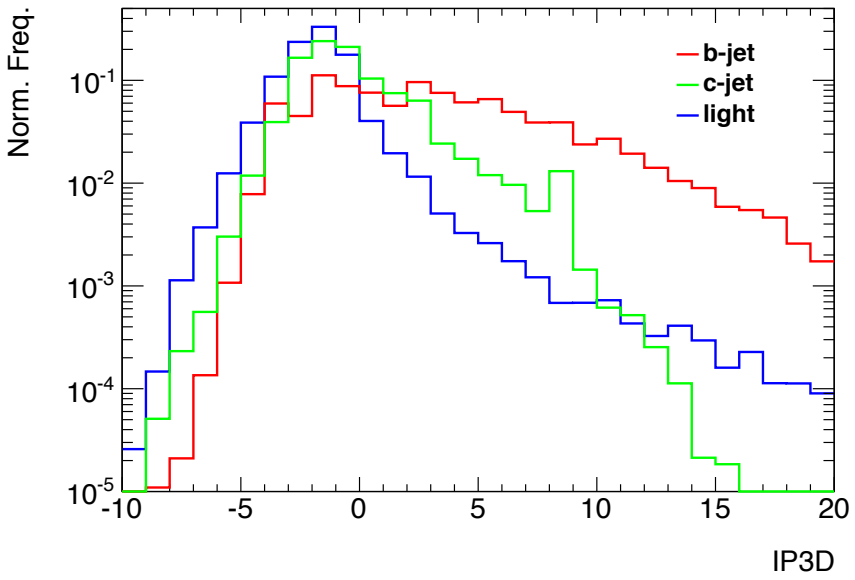


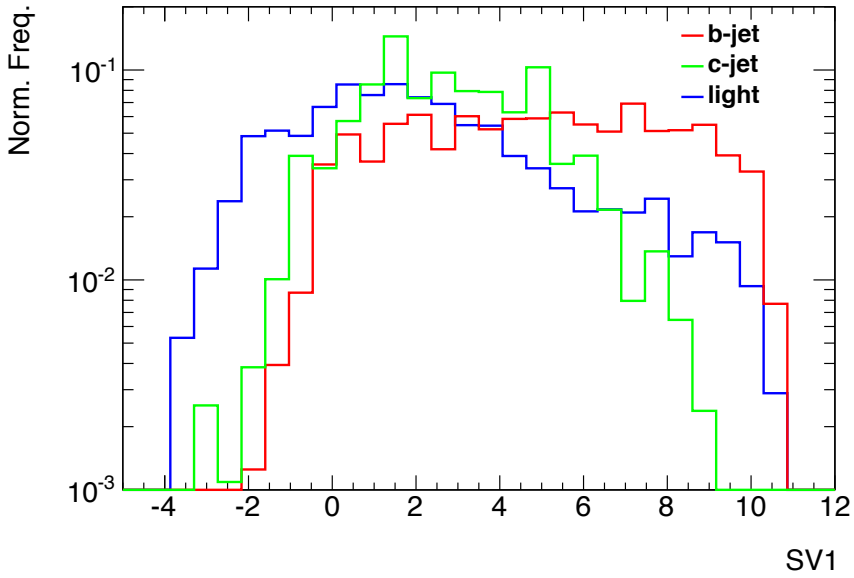


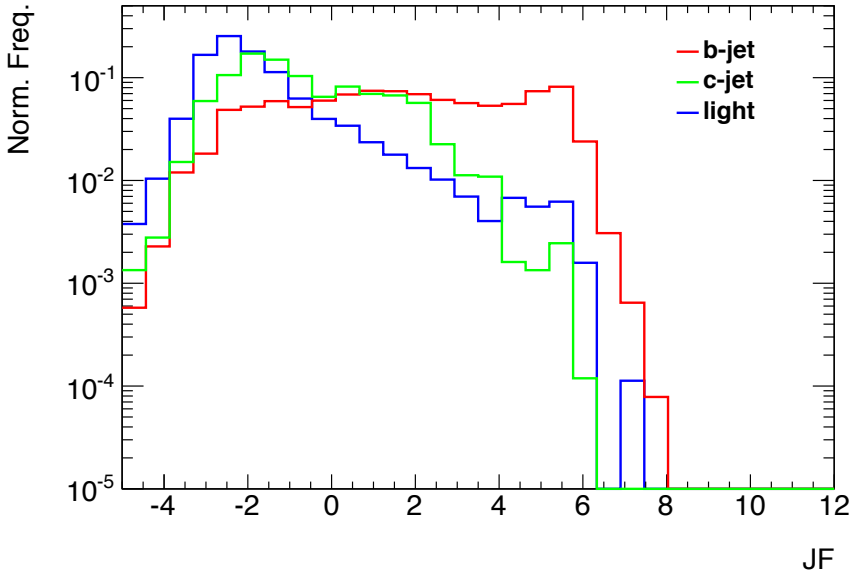


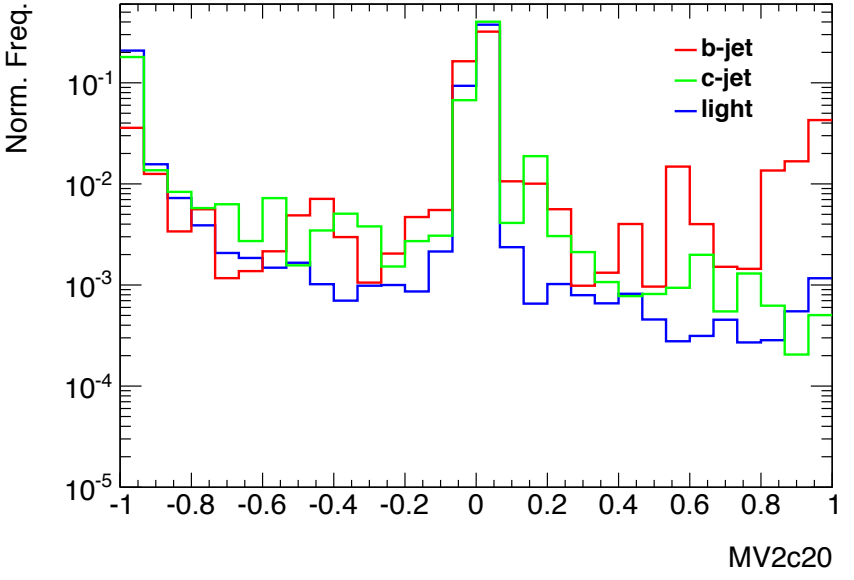
Normalised Discriminants - 20 < P_T 300 GeV

P_T Range = 20-300 GeV



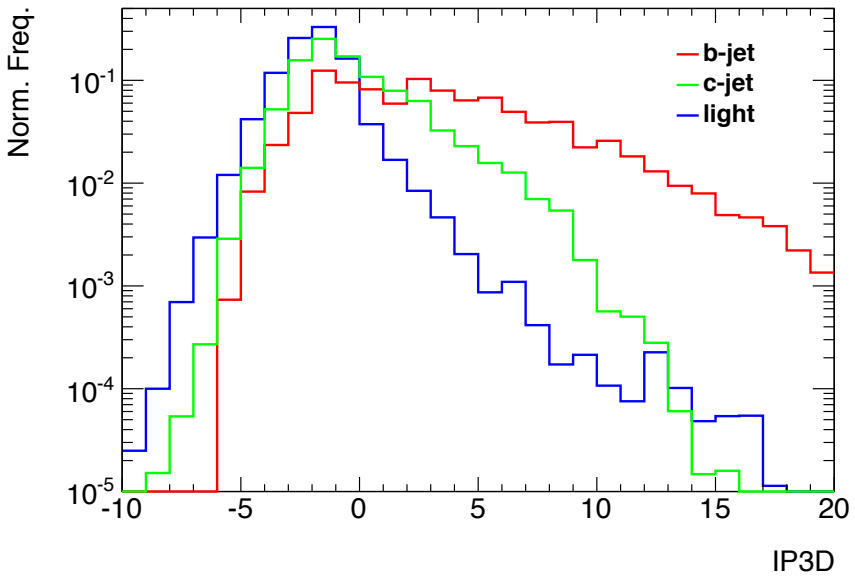


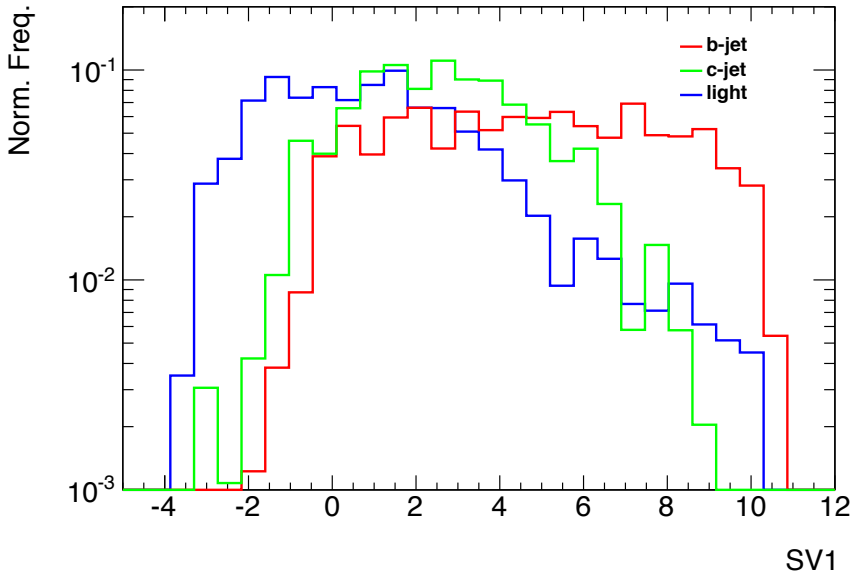


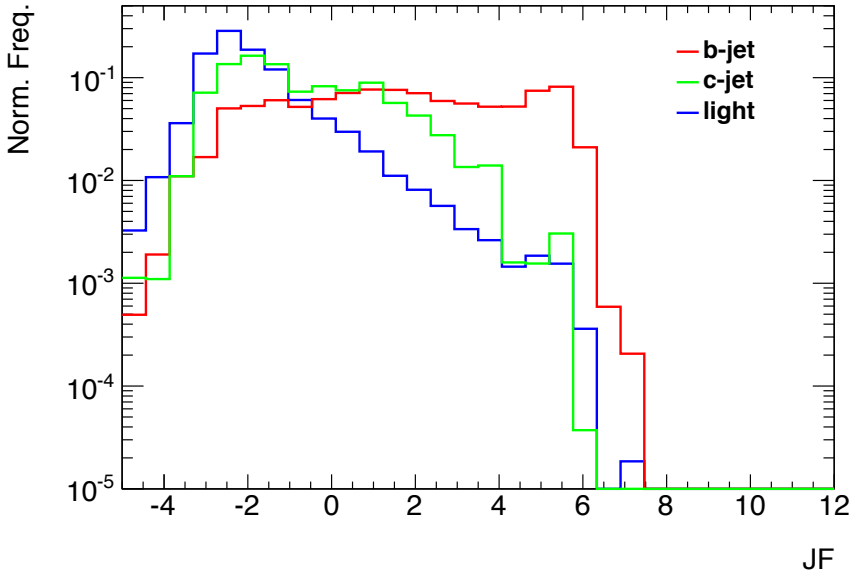


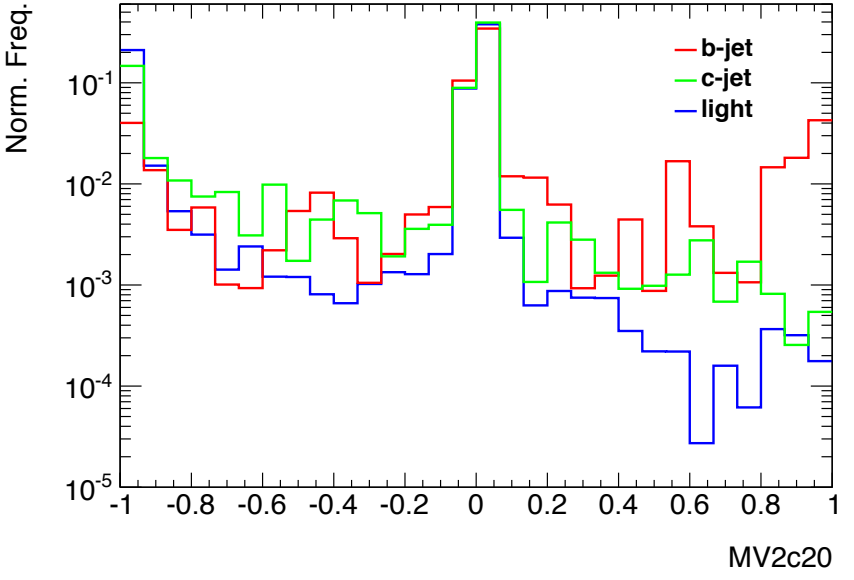
Normalised Discriminants - JZ1W

JZ1W - 20-60 GeV



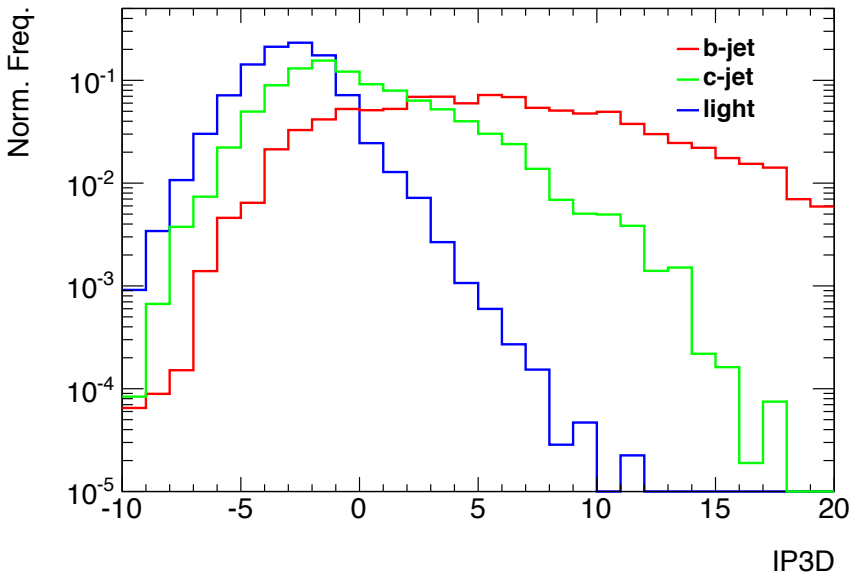


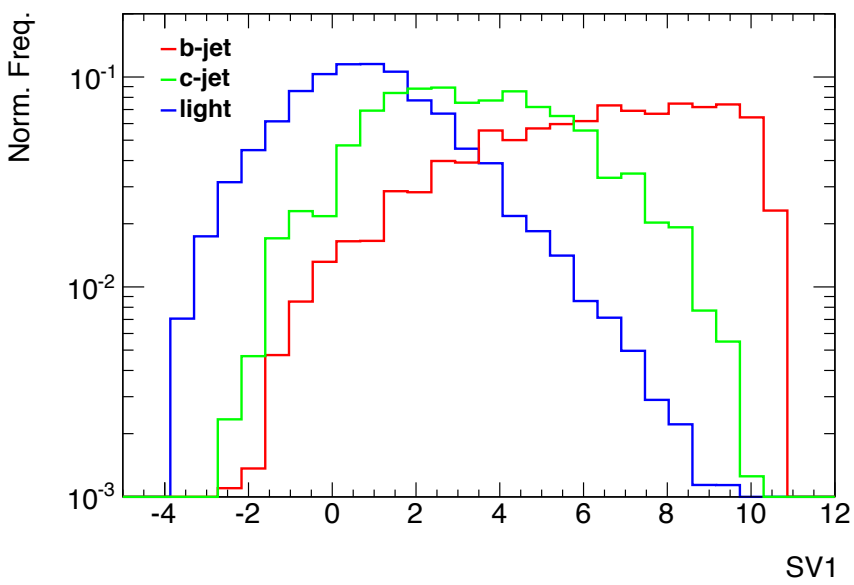


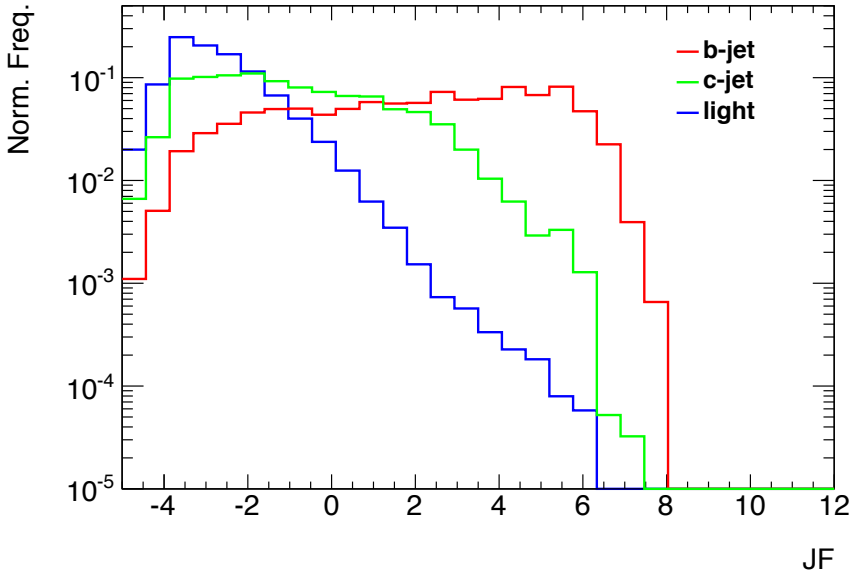


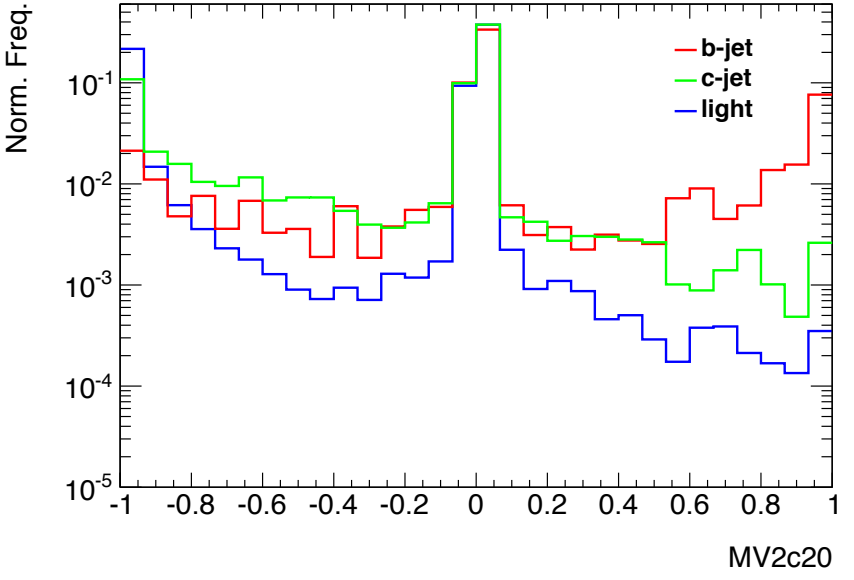
Normalised Discriminants - JZ2W

JZ2W - 60-160 GeV









To Do

- Still work to do!

- We want to better understand shape of the discriminants.

  - Plot Leading Jet Only
  - Plot P_T slices
  - mv2c00/mv2c10
  - Show the under-fill bin - algorithms have no output.

- Understand Sample

  - PV Distributions.
  - JVT Distributions.