Project #2 - Sherpa Elastic Events (Sherpa master branch)

- “Sherpa -e 10000” (same as Superchic hepMC in cernbox)

- Produces hepMC3 file
- Had to remove Weight line from hepMC file???

```
BEAMS: 2212
BEAM_ENERGIES: 3500
BEAM_SPECTRA: EPA
MI_HANDLER: None
PDF_LIBRARY: None

SCALES: METS{H_T2}{H_T2}
ALPHAS(MZ): 0.1188
ORDER_ALPHAS: 1
ALPHAS: {USE_PDF: 0}

PROCESSES:
  - 22 22 -> 11 -11:
      Order: {QCD: 0, EW: 2}

SELECTORS:
  - [Mass, 11, -11, 10., E_CMS]
  - [PT, 11, 3, E_CMS]
  - [PT, -11, 3, E_CMS]

EVENT_OUTPUT:
  - HepMC3_GenEvent[Sherpa_yyll-ees.hepmc]
```

```
HepMC::Version 3.02.06
HepMC::Asciiv3-START_EVENT_LISTING
W Weight\|EXTRA_MEWeight\|EXTRA_WeightNormalisation\|EXTRA_NTrials\|IRREG_Reweight_Type
T SHERPA\|3.0.0alpha1\|Used generator
E 0 7 16
U GEV MM
W 8.184955081177886881960 1e+01 4.85076531162654880913 19e-02 8.184955081177886881960 1e+01 2.0000000000
A 0 GenCrossSection 4.09247754e+01 4.09247754e+01 -1 -1 0.00000000e+00 0.00000000e+00 0.00000000e+00
A 0 GenPdfInfo 22 22 1.00000000e+00 1.00000000e+00 3.06635463e+01 1.00000000e+00 1.00000000e+00 0 0
```

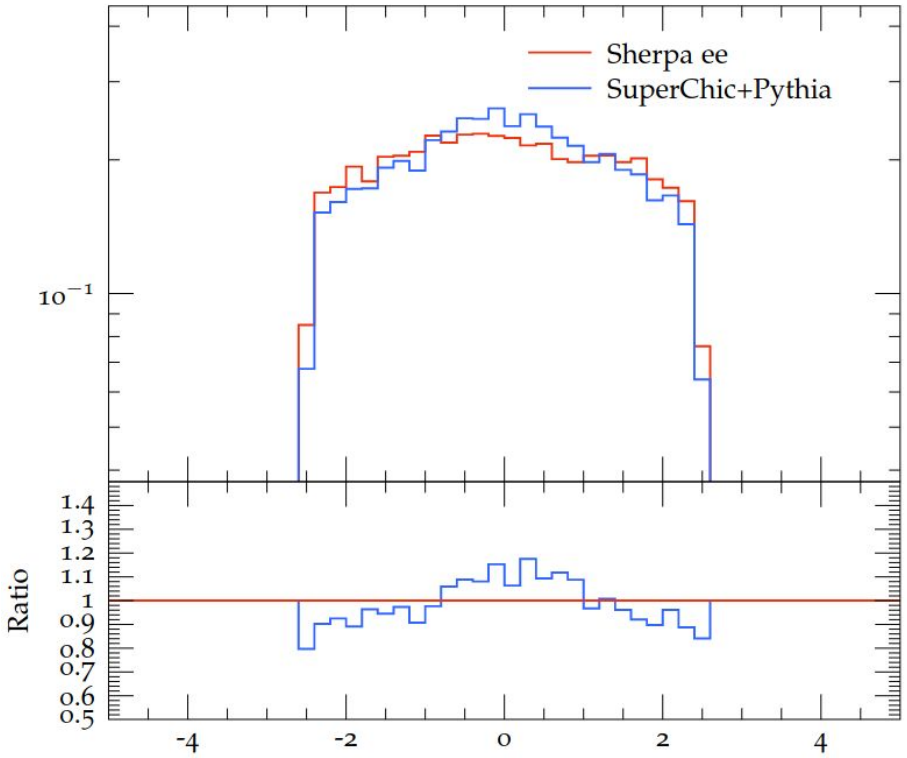
In rivet routine: apply some rapidity cut - seemed like similar cut was applied in superchic hepMC file

Run rivet for both Sherpa and Superchic+pythia hepMC files

Rivet-mkhtml Rivet.yoda:”Title=Sherpa” ../superchic/Rivet.yoda:”Title=SuperChic”

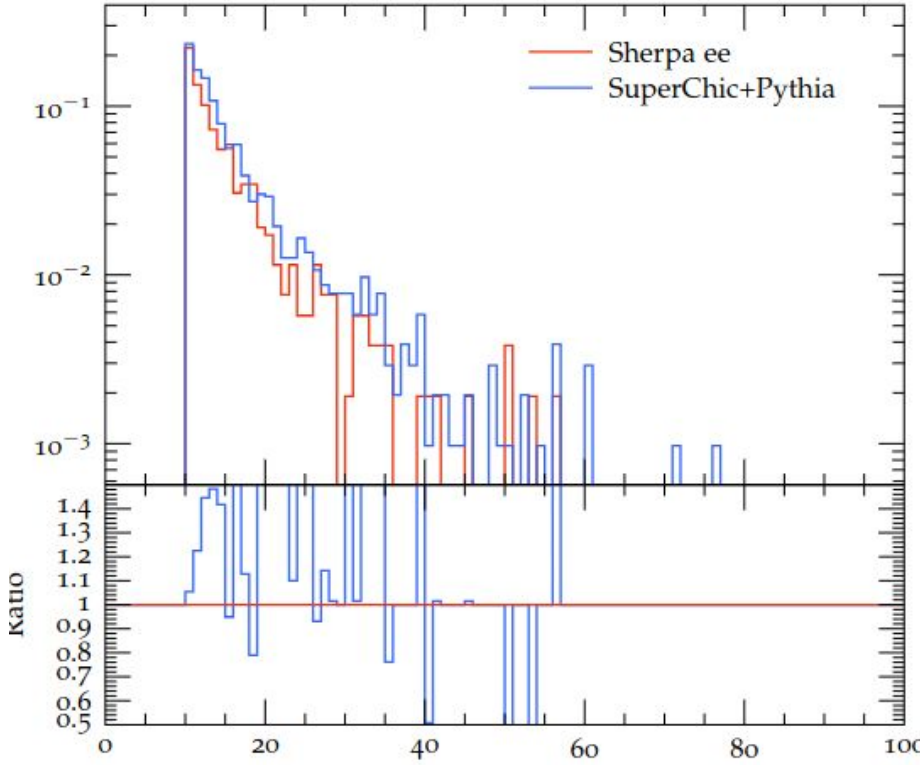
```
/// Book histograms and initialise projections before the run
void init() {

  // Initialise and register projections

  // The basic final-state projection:
  // all final-state particles within
  // the given eta acceptance
  const FinalState fs(Cuts::abseta < 2.5 && Cuts::pT > 500*MeV && Cuts::absrap < 3.0 );
  declare(fs, "FS");

  // FinalState of direct photons and bare muons and electrons in the event
  DirectFinalState photons(Cuts::abspid == PID::PHOTON);
  DirectFinalState bare_leps(Cuts::abspid == PID::MUON || Cuts::abspid == PID::ELECTRON);

  // Dress the bare direct leptons with direct photons within dR < 0.1,
  // and apply some fiducial cuts on the dressed leptons
  Cut lepton_cuts = Cuts::abseta < 2.5 && Cuts::pT > 10*GeV;
  DressedLeptons dressed_leps(photons, bare_leps, 0.1, lepton_cuts);
  declare(dressed_leps, "leptons");
```

Plots (does removing weight matter? - see prev slides)



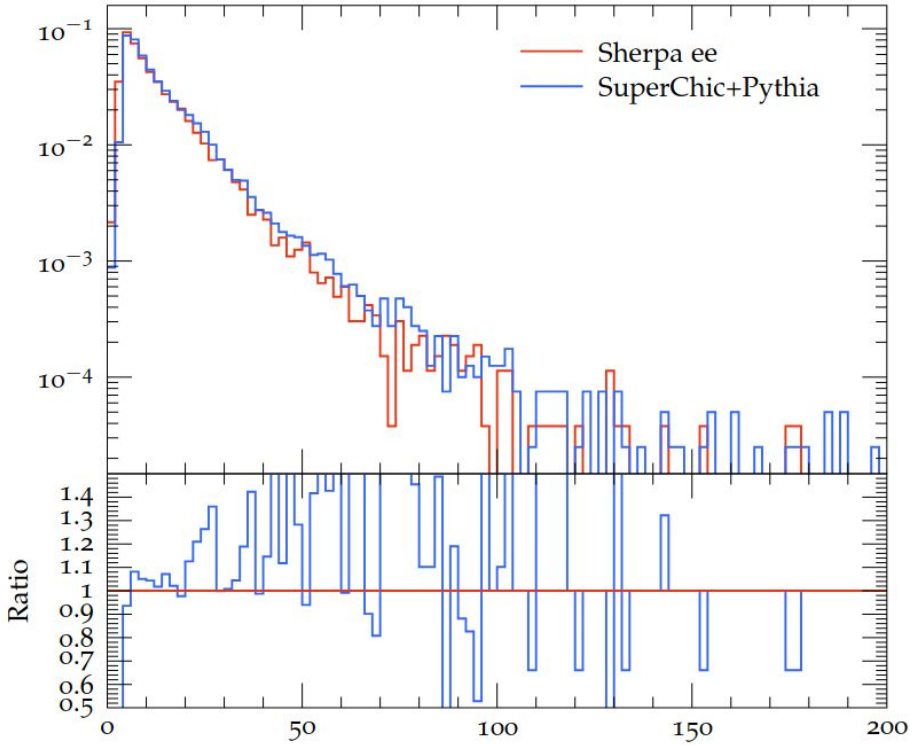
Rapidity

Plots (does removing weight matter? - see prev slides)



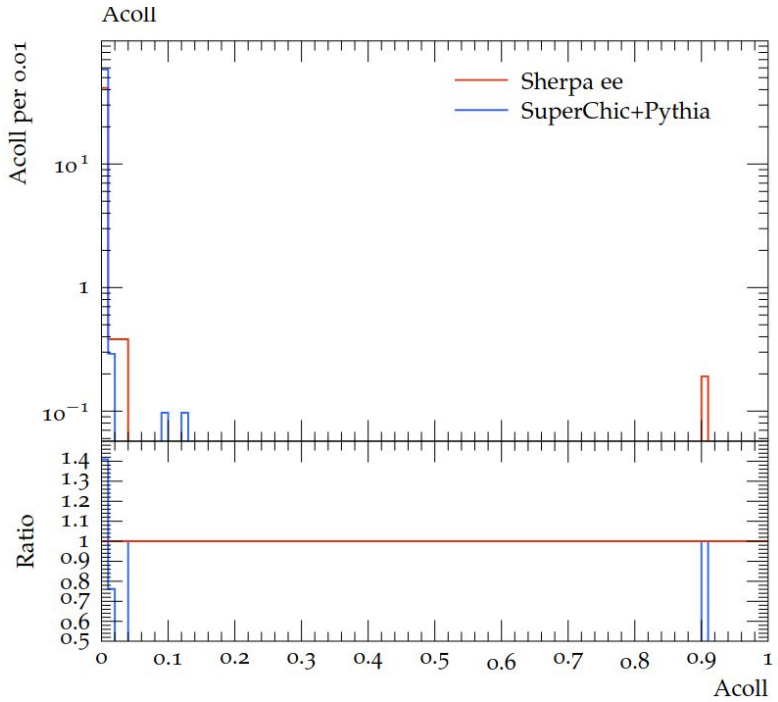
Pt l1

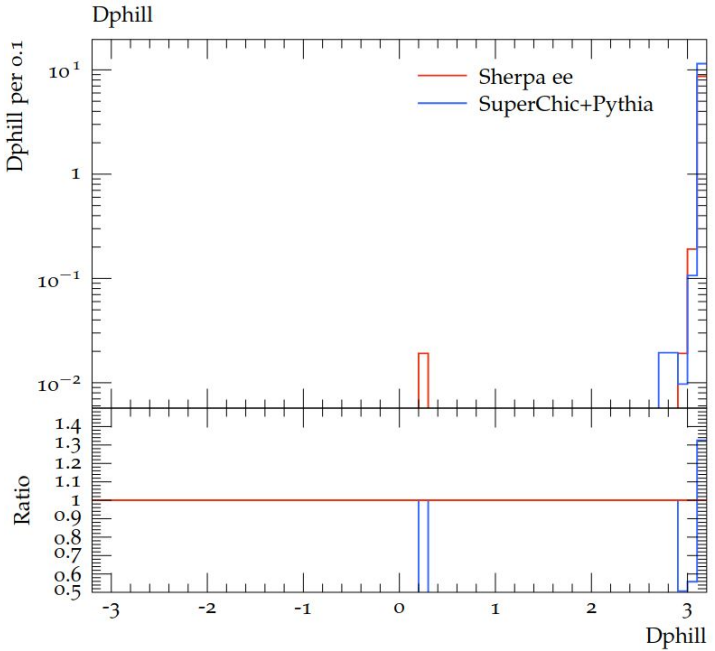
Plots (does removing weight matter? - see prev slides)



Ech

Plots (does removing weight matter? - see prev slides)





Next steps/Questions

Run sherpa with yy->WW process

How to change shower settings(?)

Trying SD production? (Not sure how/if possible?)