1. Benchmark comparison

1. done for Powheg for V+jets for jets measurements for 7 TeV, 8 TeV and 13 TeV
2. done for Sherpa jets for 7 TeV
3. Herwig7 first results on Z+jets are done
4. Sherpa for 13 TeV Z+jets in the making

Project 1.0:1: Sherpa benchmark comparison for V+jets and jets for 7,8 and 13 TeV (Marek)
Project 1.0:2: Herwig7 for V+jets and jets for 7 TeV, 8 TeV and 13 TeV (Nastja)
Project 1.0:3: Collect and analyze any difference seen in MC and data for all the distributions and generators. Which analysis selection can cause the difference?

Detailed NLO+PS generator studies
use NNPDF3.1 pdf, CUETp8M1 tune (or something different ?) for Jets, W+jets, Z+jets

Project: 1.1
- POWHEG dijet at NLO
  - effect of MPI (MPI on/off)
  - compare inclusive jets with POWHEG for different hdamp params

Project: 1.2
- POWHEG trijet with MiNLO
  - role of hdamp ?

Project: 2.1
- MCatNLO dijets at NLO
  - effect of MPI ?
  - study different merging scales

Project: 2.2
- MC@NLO 2+3 jets at NLO (FxFx)
  - study different merging scales

Project: 2.3
- MC@NLO 2+3+4 jets at NLO
  - study different merging scales

Project: 3.1
- Sherpa (in POWHEG or MCatNLO mode ?)
  - dijets at NLO
  - effect of MPI
  - study different merging scales ?

Project: 3.1
- Sherpa 2+3 jets at NLO (**3.2**)
  - PS on/off
  - study different merging scales

Project: 3.2
- Sherpa 2+3+4 jets at NLO (**3.3**)
  - PS on/off
  - study different merging scales

2, Common LHC tune

1. Have the same ME for Pythia, Herwig, Sherpa: set LO ME (2->2) settings and use reference PDF for the calculations
2. Define common data set for the calculations
    a. Measurement sensitive to higher order should not be used for tuning
    b. Define measurement sensitive to UE and hadronisation and perform the tuning
3. Validate the tune for the matched/merged calculations

Project 2.1:Select input data. understand which input data to use and at which energy. CMS latest tune show that the energy dependence parametrisation didn't work and measurements at low energies are not described. Check the tune performance with other experiments and study the possibility of improving the parametrisation (see paper of Paolo Gunnellini https://arxiv.org/abs/1801.02536)

Project 2.2 test the sensitivity of higher order MC to the input data to

Project 2,3 (effect of PDF): Powheg or aMC@NLO (with the same hard process): take a certain PDF, turn off the UE, fix alphas -> change PDF -> test on measurements sensitive to hadronisation and PS

Projet 2.3 (hadronisation): color reconnection tunes might effect the hadronisation parameters which were tuned to LEP data. Do we need to retune to the LEP data?
Check MC predictions with color reconnection tunes with LEP data (in Rivet)

3. Common treatments and storage of syst uncertainties

Project 3.1: personpower is needed in converting the older HEPData format to the newer one

4 Jet substructure

5. Designing measurements for full Run II (Bogdan Malaescu)

Defining measurements with the Run II sample, such that they are comparable between experiments. For the (V+)jets final states this can concern ALICE, ATLAS, CMS and LHCb
Project 5.1: observables, binning, systematic uncertainties that we want to publish - the format (*ongoing*). For the systematics: establish plan towards evaluating inter-experiment correlations (experience from JES correlations between ATLAS and CMS at 7 and 8 TeV)

Eventually this will allow to perform *quantitative comparisons* between measurements → Need to also identify cases where one would benefit from *combinations*

6. PDF benchmarking (Bogdan Malaescu)

Proposal to evaluate correlations between PDF sets, originating from common experimental inputs, using coherently-generated pseudo-experiments

Project 6.1: Use the xFitter framework to generate pseudo-experiments fluctuating the statistical and systematic experimental uncertainties, taking into account correlations, for an inclusive sample of data (covering all the data used for the various PDF fits)

Project 6.2: For each generated pseudo-experiment, select the data points used by each PDF fitting group and re-do the corresponding fit

(Only the nominal fit has to be determined at this stage, not the eigenvectors)

(After validation and cross-checks – see next slides)

Project 6.3: Use the ensemble of fitted pseudo-experiments to determine correlations between the uncertainties of various PDF sets

Project 6.4: *For V+jets:* compare quantitatively theoretical predictions for various cross sections, using different PDFs