Overview of the areas of work

MC generators
Interfacing, testing, validating, optimization

Detector concepts
Geometry description, full simulation, validation, parametrization, optimization

Reconstruction algorithms
Tracking, vertexing, clustering, jet finding, particle identification, optimization

Analysis
State-of-Art (python) tools, ML, ...

Computing
Porting to other OSs, Distributed computing, ...

MDI
Shared formats, Identify relevant process and codes

Monte Carlo generators (1)

- Goal: minimal complete set of generators
  - Pythia8, multi-purpose generator, reference for hadronization, gg->ffbar
    - Open physics questions: BES treatment, ISR, …
      - Also: LEP data used to validate Pythia6, is that include in Pythia8? Pythia6 still available
    - Technical aspects: is our interface to it flexible enough? Limitations of the LHE reader
  - Whizard, multi-purpose generator, LC workhorse
    - Open questions: needs validation for Z physics; probably good at higher energies (e.g. top)
    - Technical aspects: tricky to setup correctly w/ dependencies
  - LEP start of art generators
    - KKMCee (reference for f fbar), BHLUMI (low angle Bhabha scattering for lumi)
      - Status: interfaced through wrapper to produce LHE files (in progress for BHLUMI)
  - MadGraph5_aMC, Herwig
    - Available in standalone, need to get experience

Monte Carlo generators (2)

- Decayers
  - EvtGen: state of art decay treatment
    - Interfaced with Photos++, Tauola++, and Pythia8
  - Status: available in the stack but Pythia8 interface needs improvements for efficiency in treating B decays and hadronization
    - Work in (advanced) progress (M Chrzaszcz)
- Other generators
  - Znunu: small but irreducible bkg
  - P Janot Fortran implementation validation against Whizard in progress
    - Will need to be included in the stack
- What else is needed?
  - What about 4f ? 6f?
  - Input from Physics Performance

Monte Carlo generators (3)

- BES (Beam Spread) treatment: very important for FCC-ee
  - Some generators have, some don't
  - P Janot proposed a recipe for those that don't: see slides; also for ISR
    - Exists in Python: need C++ /Fortran interfaces
- Beam crossing angle
  - Some generators allow for it, some don't
    - Need/propose generic Gaudi module in the framework to add it before detector processing

Computing

- Investigating the use of distributing techniques for productions
  - Start looking at ILCDirac
    - Adding KKMCee as first example
      - We will need also other apps: e.g. the standalone Delphes ones
    - Learning use of transformations, file catalogue, etc
      - Also, how store and compare efficiently config cards
  - Reactivating the FCC VO in progress
    - FCC quota connection with HTCondorCE; same for EOS quota
  - Would allow to include seamlessly national resources, if any
- For the first production (see dedicated page)
  - Use system setup by Clement