Check-list towards a new 250 GeV ILD MC production

Generator

- **physics:**
  - define samples **- ok for now:**
    - DBD 250 GeV + 6f
    - general purpose Bhabhas / BSM signals etc. **=> later...**
    - question from Daniel: status of tau polarisation in Whizard2 => can be checked on existing small test samples transverse tau polarisation: Akiya did some work, **unclear status**
    - Number of events for each processes: see table by Junping, basically 10ab-1.
    - **still iterate on very high-rate processes (aa2f, ae3f, etc)**
    - Radiative return to Z events: Generate inclusive 2f as before, **plus dedicated samples later eg with photon in ME**
  - **Naming convention of whizard2 samples and directory structure ok up to 4f, iterate 6f**
    - all bWbW => "ttbar"
    - WW/ZZ/ WWZZ etc needs fleshing out
- **general:**
  - verify batch mode - **done, apart from splitting single channel into several jobs**

    => Whizards need to implement input of start event number > 1
  - tagged Whizard version => hoping for 2.8.3 in a week or two...
- **ee:**
  - generate events
    - 2f (need splitting functionality, s. above)
    - 4f
    - 6f (define structure, s. above)
- **ea / ae / aa:**
  - create lumi spectra and z-position of vertex distributions => done
  - **more studies: phase space splitting between Zee and aa->2f**
  - generate events: very high-rate processes, s. above
- aa overlay : => produced, on Dirac
- seeable pairs: fine, on Dirac

Simulation

- selection / adjustment of DD4HEP detector model => done
- create ddsim steering / config files for 250 GeV
- z vertex distributions for ee / ea / ae / aa => Remi has put them in ILDConfig:
  - https://github.com/iLCSoft/ILDConfig/blob/master/StandardConfig/production/Documentation/ProductionSettings.md#250-gev-vertex-parameters-for-250-seta-beam
- verify that photon cluster position effect is not due to cell geometry problem => expected? Then calibration issue?
- simulate full pairs => done
- BeamCal bg-map for large (and small) 250 GeV models => done
- **simulate seeable pairs**
- **simulate aa overlay**
- **simulate single particles for calibration => LumiCal / LHCal currently not covered!**

Reconstruction

- muon reconstruction failure at costheta = 0.6 => fixed by Remi
- **photon cluster position / angle bias => theta "just" a calibration/correction issue, phi unclear? => gave up**
- photon energy calibration consistent with Pandora calibration
  => seems to be ok as verified by Remi
- z0/d0 errors in fwd region => what was this about? => gave up
- tune BeamCal reconstruction done
- **calibrate LumiCal & LHCal => not done**
- **update parameters for beam spot constraint (LCFI) ???**

- **validation: ongoing ....**

Production

- disk space (Cannot use tape back-end anymore) => estimate need: ~200 TB
  => mc-opt3 currently is 600-700 TB => 1 detector model = 350 TB
  keep only 10% of REC files (but all SIM files) => 25% less ?
  (hybrid simulation, reco only SiW + AHCAL)
- Installation of DESY new disk - done
- Save sim files of all events, but save REC files only for a fraction of events => implemented by Akiya
- **Required statistics : 2ab-1 for each channel? => to be discussed, JL's understanding was we aim for numbers in JT's table for DSTs, while keeping only small fraction of REC evts**

  Estimate required disk space and CPU times for required statistics.
  How about the large cross-section channel? (2f, 4f)
  How about the 6f samples?

- update production scripts
  - make sure whizard2 lcio file splitting works=> Confirmed(Akiya)
  - Update for new directory structure and file name conventions.
    Revisit file name convention : "wizard2" as "w2"?
    ==> (Akiya) Same as the previous productions. Namely no generator name in production files.
  - simulate aa_lowpt and seeable pair background files. Update scripts to 250 GeV background files.
    ==> (Akiya) Small number of background files will be produced with ILCSoft/ILDConfig v02-00-02, for validation.(Done. 100evtsx20files produced)

- Need small whizard2 samples of various process type for development of production scripts.
  ==> (Akiya) Small samples (2f, 4f, aa_2f, 3f/5f) have been produced. Modifying production scripts to adapt new naming convention.
- Save tar-gzipped log files on tape directory.
- File save location : DESY-SRM as primary and KEK-SRM as secondary.
- BG samples situation

	Gen TDR	Gen Set A	SIM TDR	Sim Set A
aa_lowpt	Produced	Available on DIRAC (Tim)	Produced	To be produced with v02-01
seeable pair	No	Available on DIRAC (Mikael)	No	To be produced with v02-01
IP smear	No			Known, being used in production
Nb of ExpBg			Available	Available

Solved issues (for new productions)

- muon reconstruction failure at costheta = 0.8 => TPC hits in simulation
- TPC point resolution