MC production report

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- ▶ Taking requests for CLICdet and Whizard 2
- ▶ Twiki page with production overview:
  `https://twiki.cern.ch/twiki/bin/view/CLIC/MonteCarloSamplesForCLICdet`
- ▶ Recent production:
  - ▶ ZHH at 3 TeV for Matthias' study
- ▶ Recent meeting of the MC generators group $\rightarrow$ report on the next slides
  `https://agenda.linearcollider.org/event/8319/timetable/?view=standard`

Radiative Bhabha scattering

Launchpad `https://answers.launchpad.net/whizard/+question/685180`

Status Open

Details
- ▶ Process to generate: $e^+e^- \to e^+e^-\gamma$ (background to monophoton if both of the electrons are either very soft or stay in the beam pipe)
- ▶ ideally no cuts can be placed on the electrons, only on the photon
- ▶ this leaves numerical singularities due to small electron mass

Solution
- ▶ preliminary solution: use extended precision or quadruple precision for the integration (option in Whizard config → new versions installed by Marko)
- ▶ currently under investigation by Jean-Jacques (issues with luminosity spectrum)

Alternative weights

Goal TGC samples (WW → qqlnu) with production based on the reweighting procedure described here: `http://bib-pubdb1.desy.de/record/94888`

Launchpad `https://answers.launchpad.net/whizard/+question/684019`

Problem 1 Propagating the weights for each event based on alt_setup

Status LCIO alternative weights are written: SOLVED in Whizard 2.8.2

Problem 2 Alternative weights only determined for the first event

Status Bug was found by Whizard authors, will be fixed in the future

Workaround the couplings are not reset for SM after the first event → reset them manually in the `alt_setup` statement

Problem MPI running does not work with resonance history switched on

Details Whizard gets stuck at "MPI: wait for master to finish process initialization"

This is actually also mentioned in the manual (3.3.2) that for processes with resonance history the parallelization with MPI is not yet available.

Status Will test workaround suggested by Mikael Berggren

Integration grids with CIRCE2

Problem   Whenever beam spectra (circe2) are used, the integration grids are discarded when running in the same directory:

`VAMP: parameter mismatch, discarding grid file 'decay_proc.m1.vg'`

although it works when there is no circe2 used

Status
- Reason: seed of random number generator was included in the MD5 sum used to check if grids are consistent
- Fixed in forthcoming Whizard 2.8.3

Workaround   `?check_grid_file = false` (careful!) OR fix random seed

Displaced decay vertices in Whizard

Problem For Long-Lived Particles (LLP) searches, need displaced decay vertex in the event record

Details
- ▶ Process: chargino pair production where the charginos decay to a neutralino and a pion: $e^+e^- \rightarrow \tilde{\chi}_1^+ \tilde{\chi}_1^- \rightarrow \tilde{\chi}_1^0 \pi^+ \tilde{\chi}_1^0 \pi^-$
- ▶ Event record from WHIZARD does not contain the displacement

Status Open in Whizard, but existing workaround

Workaround Using Geant4 to propagate the LLP (reported in
https://indico.cern.ch/event/825332/contributions/3495585/)