Software Coordinators Report

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ILD Meeting, June 17, 2020

Outline

- Generator
- Reconstruction
- Test release for 250 GeV production
- Delphes2LCIO

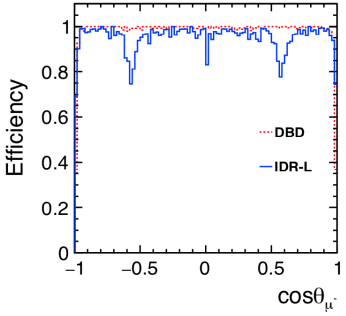
report from *ILD Software Convenors Meeting* today

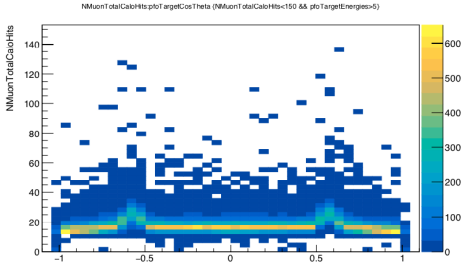
Generator M. Berggren J.Tian

- tau-polarisation issues in whizard are fixed now
  - included in Whizard HEAD
  - test pending
- still remaining issue with virtual gammas in aa, ae events
  - plan to generate events as fermion events
  - need to adjust *naming convention* accordingly
- for 2f events w/ huge cross section, scripts have to be prepared to run as split processes
- need to sort out temporary storage (10 TB) before starting generation
- observe issue in generating events w/ Whizard when using MPI
  - used to work w/ last Whizard release
  - to be tested with new 2.8.3
- Whizard 2.8.3 about to be released
  - within days (to be checked w/ authors)

should be ready to **start with generation very soon** ...

- issue in the μ-sample:
  - drop in efficiency in barrel-endcap region
- fix by setting *maxMuonHits* for muon algorithm from 30 to 100
- checked uds-events @ 500 GeV and found no issue





Test release for 250 GeV production

- aa-background overlay numbers for 250 GeV
  - need iteration on the new numbers (seem a bit high)
- D.Jeans updated Sci-Ecal strip-splitting reconstruction
  - verified w/ single 10 GeV photons -> pending PRs
- new LCIO version:
  - new thead-safe SIO implementation and *delphes2lcio* module
- creation of **mini-DST**: need to include steering file and also code
  - see talk (S.Kawada)
- J.Tian will commit training code for IsolatedLetponTagger to MarlinReco
- potential update on SDHCal reconstruction ?

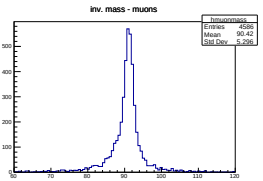
Delphes2LCIO - overview

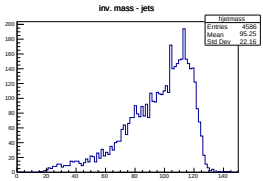
- added an example *delphes2lcio* to the LCIO repository
  - will be available in next LCIO/iLCSoft release
  - see: https://github.com/iLCSoft/LCIO/tree/master/examples/cpp/delphes2lcio
- create *mini-DST* from Delphes output reading *.stdhep* files

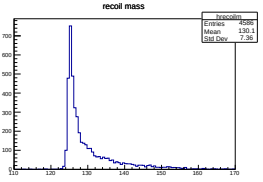
COLLECTION NAME	COLLECTION TYPE	DELPHES BRANCH
Electrons	ReconstructedParticle	Electron
Jets	ReconstructedParticle	Jet
MCParticle	MCParticle	Particle
MCTruthRecoLink	LCRelation	n.a.
Muons	ReconstructedParticle	Muon
PFOs	ReconstructedParticle	EFlowTrack
		EFlowPhoton
		EFlowNeutralHadron
Photons	ReconstructedParticle	Photon
RecoMCTruthLink	LCRelation	n.a.

Delphes2LCIO - code examples

```
LCIterator<ReconstructedParticle> jets( evt, "Jets" ) ;
LCIterator<ReconstructedParticle> muons( evt, "Muons" ) ;

if( jets.size() != 2)
  continue;

if( muons.size() != 2)
  continue;

auto mu1 = muons.next();
auto mu2 = muons.next();
hmuonmass->Fill( inv_mass( mu1, mu2) ) ;

auto j1 = jets.next();
auto j2 = jets.next();
hjetmass->Fill( inv_mass( j1, j2) ) ;


// the recoil mass
const auto& vm1 = v4(mu1) ;
const auto& vm2 = v4(mu2) ;
TLorentzVector ecms(0.,0.,0.,250.) ;
TLorentzVector recoil = ecms - ( vm1 + vm2 ) ;
hrecoilm->Fill( recoil.M() ) ;
```







- added some easy examples to create plots with ROOT macros form LCIO mini-DSTs directly, e.g. Higgs-recoil

Delphes2LCIO - new event summary collection

- new *experimental* feature: write *EventSummaries* at end of file
- can be used to *selectively* read events of interest
  - potentially speed up reading large data sets significantly
- could be applied also to other mini-DST samples or even existing DST-merged samples
- need to iterate and agree on contents of *EventSummary* class

```
int nEventTotal = lcReader->getNumberOfEvents() ;

// --- read dummy evt with summaries
evt = lcReader->readEvent( -99, -99 ) ;

auto escol = evt->takeCollection("EventSummaries") ;

for(int i=0 ; i< nEventTotal ; ++i){

  EventSummary es( escol->getElementAt(i)  ) ;

  // --- pre-cut
  bool myCut = ( es.getMuonNum()== 2   &&
                 es.getJetNum() == 2 ) ;

  //---- read only events fulfilling the pre-cut
  if( myCut) {

    evt = lcReader->readEvent( es.getRunNum(),
                               es.getEventNum());

    // start event processing here
```