A brief report of tth calculation by Whizard.

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1. Cross section check: σ(tth) vs σ(bxybxyh)

   $e^-_L e^+_R$, with ISR && BS

σ(tth)	: 6.1183 fb	c.f. $\sigma(e^-_R e^+_L \rightarrow tth)$ ~ 2.597fb
σ(bWbWh with bW~t)	: 6.4039 fb	
σ(bxybxyh with bxy~t)	: 2.6159 fb	

   σ(bWbWh)*Br(W$\rightarrow$qq)^2/σ(bxybxyh) ~ 0.92

   - Br(W$\rightarrow$qq)=0.6667 is used. Last time,
     I used Br(W $\rightarrow$qq)=0.7 and difference was much bigger
   - Top width = 1.4968 GeV by Whizard calculation.
                = 1.523 GeV in default whizard.mdl

     σ(bxybxyh with bW~t) decreases by ~ 3%, if Wtop=1.523 GeV is used.

   - Integration result of bxybxyh with bW~t

! It	Calls	Integral[fb]	Error[fb]	Err[%]	Acc	Eff[%]	Chi2	N[It]
27	600000	2.6159451E+00	8.02E-03	0.31	2.37	3.93	0.40	3

➜ now bxybxyh with all diagrams by 7 days job

Background processes

- **Total cross section with ISR & BS, no pol. beam**

tt	1.9659682E+02 fb
ttg	4.1759286E+01 fb
ttgg	5.7643777E+00 fb
ttz	4.4942257E+00fb
tth	2.1792379E+00fb
wwww	7.1567734E-01fb
zzww	4.2575859E-01fb ➔ 425 events/1ab^{-1}
zzzz	3.0240802E-03fb

Green: e_R^-
Red: e_L^-
$e^+e^- \to ttZ$ (no-pol)

- **Technical problems in generating 8 fermion processes**

  1. There are more than 600 quark combination in 8 quarks final states
  2. Try 8x, 6x2y, 4x4y, 2x6y, 8y (signal diagrams are included in 4x4y)
      ➔ Omega hits ~ 1.5GB memory limit or gfortran fails to compile
  3. Try bxybxyuu. Built with doubled MAX_CASCADE in limits.f90.
      ➔ Hit 1.5GB memory limit or took 24 hours for 1 sample of integration
  4. budbducc
      ➔ 24 hours for 2 interations and ACC=200~400

- **Plan (Options)**
  1. default_jet_cut: 10GeV ➔ 50 GeV for ex.
  2. Write subroutine cut in user.f90 and require M(jj)~Mw or MZ and M(jjj)~Mt
  3. Restrict diagrams. bud~t and/or ud~W and/or cc~Z
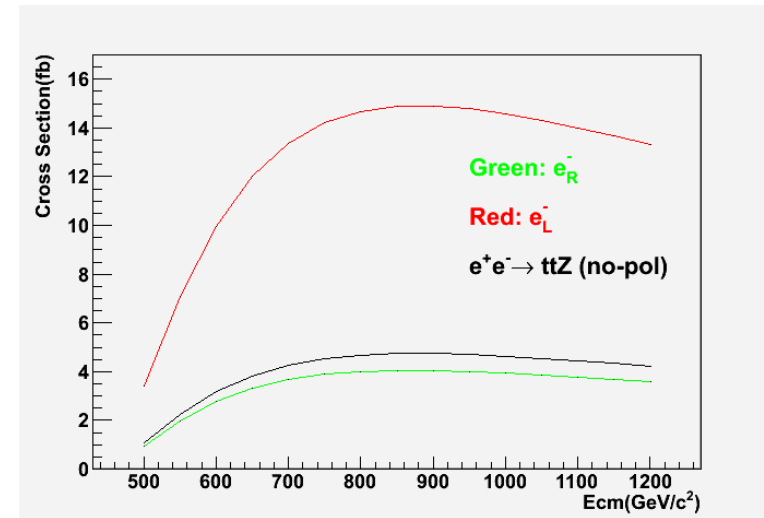
Plan for ALCPG11

How to respond to our responsibility written in Benchmark document ?
-- Plan should be reported at ALCPG11

Tim Barklow, Mikael Berggren, and Akiya Miyamoto have developed a semi-automated system for generating particle-level events using WHIZARD. This program allows generation of Higgs signal events, Standard Model e^+e^- background, and Standard Model two-photon background, including backgrounds from beamstrahlung photons. Barklow, Berggren, and Miyamoto have agree to take responsibility for generating a common sample of physics and background events to be used by both ILD and SiD in the exercise.

Our goal:
1. Provide signal samples for 1 TeV benchmarks

      e+e- → nnH (Tim)
      e+e- → W+W- (Mikael)
      e+e- → ttH (Akiya)

2. Code ready for sample production, aiming to provide all SM background samples by summer.

Questions:
1. Need to report our plan at ALCPG11 at Sim/Reco parallel session.   Volunteer ?
2. Where do we put our test samples ?
    /grid/ilc/mc-2011/generated/test/   ???
3. Beam background samples: $\gamma\gamma$ →hadrons and pairs

Plan of benchmark sample production for ttH (Draft)

1. 1 TeV ttH signals samples :
   (a) 6q+h $\qquad$ b,x,Y,B,X,y,h
   (b) $[\mu\nu_\mu|\tau\nu_\tau]$+4q+h $\qquad$ b,n2:n3,E2:E3,B,X,y,h + b,x,Y,B,N2:N3,e2:e3,h
   (c) eν_e+4q+h $\qquad$ b,n1,E1,B,X,y,h + b,x,Y,B,N1,e1,h

   Luminosity: 2ab-1, Beam polarization: (e^+,e^-)=(L,L),(L,R),(R,L),(R,R)
   (d) and (e) is low priority, if no request from ILD/SiD
   h decays to all decay mode by Pythia.

   (a) is my goal by ALCPG11

2. 1 TeV 8 quarks background samples:
   Full 8 quark diagrams with current is difficult. Kinematical cuts relevant to tth
   analysis or diagram selection will be applied.
   It may be difficult to

3. 1 TeV 1 lepton + missing + 6 quark.
   Same conditions as 2.

4. 1 TeV 6 fermions : generate with default mass cuts (10 GeV)