SiD and ILD Analyses of the WW Benchmark

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Selection of $e^+e^-\to W^+W^-\to qql\nu$

- SiD Analysis
  - One isolated lepton, jet based isolation
  - Two jets, kt algorithm with R=0.7
  - N_{PFO}(in jets) > 12
  - $60<M_W^{had}<100$ GeV
  - $M_W^{lep}<250$ GeV
  - $E_W^{had}>300$ GeV
- ILD Analysis
  - $N_{PFOs} > 15$, $E_{vis} < 1200$ GeV, $M_{vis} > 100$ GeV, $P_T > 5$ GeV
  - One isolated lepton, cone based isolation
  - Two jets, kt algorithm with R=1.3
  - 2C kinematic fit
  - $\tau_{discr} > 1$
  - $40<M_W^{fit}<120$ GeV
  - $\cos\theta_W > -0.95$

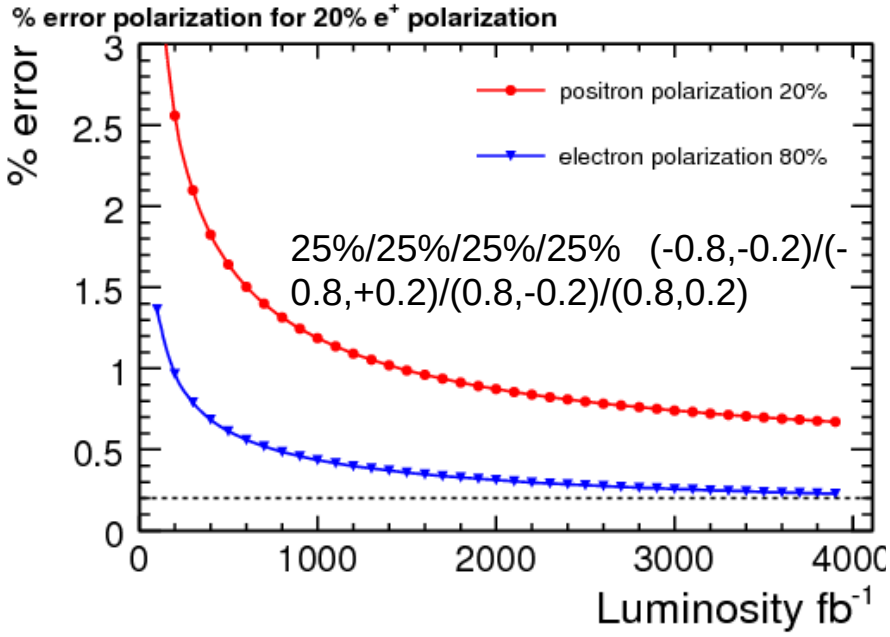
- N_{signal} = 150415 (lumi 500 fb^{-1}, Pe^-,Pe^+=-0.8,0.2)
- N_{signal} = 380510 (lumi 500 fb^{-1}, Pe^-,Pe^+=-0.8,0.2), eff = 36%

Background Processes

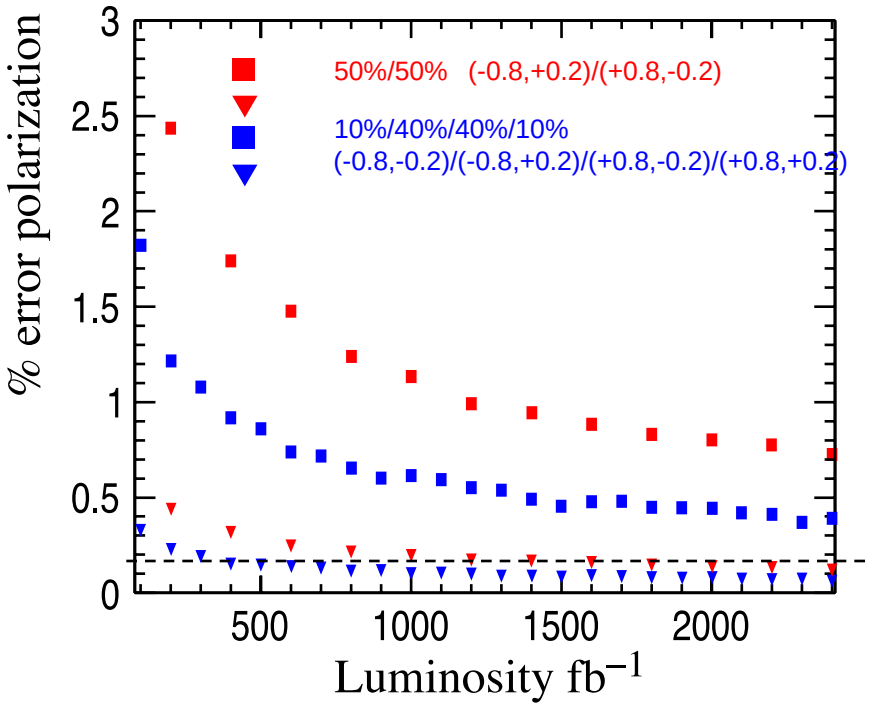
- SiD analysis:
  - Complete SM processes: 2f, 4f, 6f, $\gamma\gamma$/eγ/minijets
- ILD analysis:
  - 2f, 4f, 6f
  - Missing: $\gamma\gamma$/eγ/minijets
    - First look at some eγ->3f processes without Weiz-Will γ, but very low statistics.
    - Appears manageable with tighter cuts on the fit probability + E_{W}^{had}
    - Expect a reduction of the efficiency by a factor ~1.8 (needs additional studies) and consequently an increase of the statistical error by ~$\sqrt{1.8}$.

Polarization Measurement

Blondel method



Angular fit of the W production angle



Summary

$\sqrt{s} = 1$ TeV, lumi 500 fb^{-1} for each configuration -0.8,0.2/0.8,-0.2

ILD Signal: qqlν Bkgd.: 2f, 4f, 6f		ILD (estimate) Account for γγ/eγ bkgd.		SiD Signal: qqlν + qqqq Bkgd: all SM processes	
ΔP_{e-}	ΔP_{e+}	ΔP_{e-}	ΔP_{e+}	ΔP_{e-}	ΔP_{e+}
0.00155	0.00227	0.0021	0.0030	0.0020	0.0029

SiD 2f 4f 6f Bgnd Only

$\Delta\lvert P_{e^-}\rvert$	$\Delta\lvert P_{e^+}\rvert$
0.0019	0.0029