

Summary of MC requests for DBD benchmarks

ILD Workshop, Kyushu University

May 23, 2012

Context

- Software validation is underway, expect to finish soon → Mass production will begin shortly after
- Topics to discuss today:
 - MC requests by benchmark process
 - Pre-selections?
 - Common samples for different analyses
 - Priorities
 - ...

DBD Benchmark Processes

- Benchmark processes at 1 TeV (to be done by both ILD and SiD):
 - $e^+e^- \rightarrow \nu h^0$ at $E_{\text{CM}}=1$ TeV with a SM Higgs with $m_H=120$ GeV, in the final states $h^0 \rightarrow \mu^+\mu^-, bb, cc, gg, WW^*$. The goal is to measure the **cross section times branching ratio**.
 - $e^+e^- \rightarrow W^+W^-$ at $E_{\text{CM}}=1$ TeV, considering both hadronic and leptonic (e, μ) decays of the W . The goal is to use the forward W pair production cross section to measure **in situ the effective left-handed polarization**.
 - $e^+e^- \rightarrow t\bar{t}h^0$ at $E_{\text{CM}}=1$ TeV with a SM Higgs with $m_H=120$ GeV, in the final state $h^0 \rightarrow bb$. The reaction involves the 8 jet mode and the 6 jet + lepton mode. The goal is to measure the **Higgs boson Yukawa coupling to $t\bar{t}$** .
- In addition, repeat one analysis from LOI using the final detector configuration and up-to-date simulation software.
 - Both ILD and SiD has chosen **$t\bar{t}$** at 500 GeV.
- ILD will also update:
 - Higgs self-coupling measurement **Zhh** at 500 GeV
- The DBD benchmark processes are covered well.
- Reminder: ILD and SiD are suggested to perform the *same* analysis using the *same* samples. → Common Sample Group has been setup to generate the samples. **For the analysis, collaboration with SiD group is necessary.**

Analysis will be carried out by groups at:

NDU, KEK

DESY

Birmingham,
Edinburgh,
KEK, Tokyo

LAL, Barcelona,
ICCUB, SIC,
IFIC

KEK, Tokyo

Summary of MC requests

- nunuh [1 TeV]:
 - nunuh signal: $\sim 1\text{M}$ ($2ab-1$) $[-0.8/+0.3]$
 - 2f+4f: start with nominal sample requested by WW
 - request more samples with pre-selections if needed
 - 6f: $1ab-1$, **0.5M events (shared)** ←
- WW [1 TeV]:
 - qqlnu: 260 fb-1 , **1.1M events**
 - equally divided for 4 polarizations
 - Zee, Znunu: 100 fb-1 , **$\sim 1.2\text{M events}$**
 - other 4f: 200 fb-1 , **$\sim 0.8\text{M events}$**
 - 2f: 100 fb-1 , **$\sim 0.5\text{M events}$**
- tth [1 TeV]:
 - tth + ttz + ttbb: total of $4ab-1$, **50k events**
 - 6f: $2ab-1$, **1M events** ←

could be shared

- tt [500 GeV]:
 - 6f: **$\sim 2\text{M events}$**
- Zhh [500 GeV]:
 - Zhh signal: **$< 1\text{M events}$**
 - ZZh, ZZZ, ttqq, bbbb, Zh bkg: total of **$< 1\text{M events}$**
 - 6f: **$\sim 10\text{M events}$** , need more generator files

will be simulated at KEK/CC

could be shared