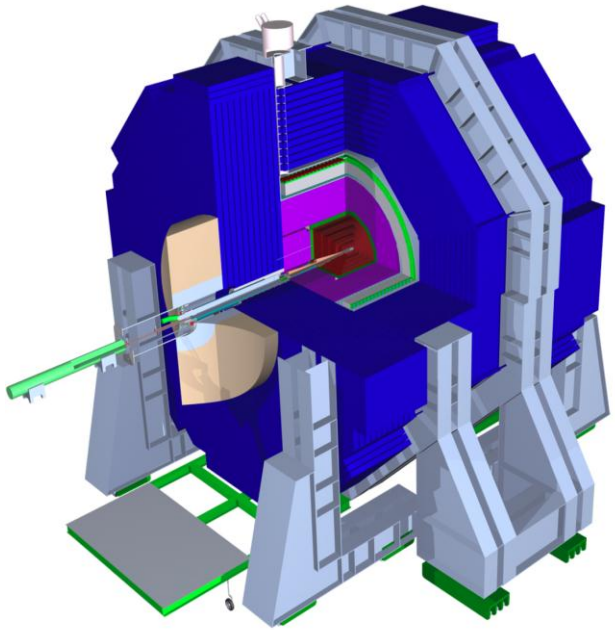
Charge to the SiD Workshop



Andy White
University of Texas at Arlington

The Main Issues

1) The DBD

We have a substantially complete document, *but*

- needs review/editing
- benchmark results need final review
- a common table of SiD/ILD benchmark results (meeting tomorrow 10pm with ILD!)
- common style file issue

DEADLINE January 21

2) SiD and the U.S. HEP Community Exercise – SNOWMASS 2013

- This process together with HEPAP/P5' will define our future for the next ~10+ years
- We have an opportunity to make sure that a linear collider physics/detector program is part of the U.S. HEP profile of activities.

The Main Issues

3) Agency support for ILC/SiD ?? DoE “Frontier” realignment.

4) Ongoing R&D for SiD

- We have achieved a significant amount of R&D so far with limited resources, but there is still a substantial list of items to be studied (VTX modules, TRK tile assembly/testing, subsystem options, alignment, power pulsing, etc. etc.)

5) SiD’s role in the new Linear Collider Organization

6) SiD’s Future

Expanding SiD

SiD Collaboration

SiD and the ILC in Japan

CLIC-SiD and CERN

The SiD Detailed Baseline Design

The ILC PAC "frozen" version:

http://www.desy.de/~stanitz/DBD-pac101212.pdf

Nightly builds are still available at:

http://stanitz.web.cern.ch/stanitz/dbdnightlybuild.html

Everyone here – read the chapters/sections that you are most associated with – use SVN to make edits/ or send to Marcel or me!

Review critically the benchmark results as they are presented – the ILC physics and detector capabilities versus LHC will be a critical element of the SNOWMASS 2013 exercise!

Creating the SiD DBD

Main DBD Editors:

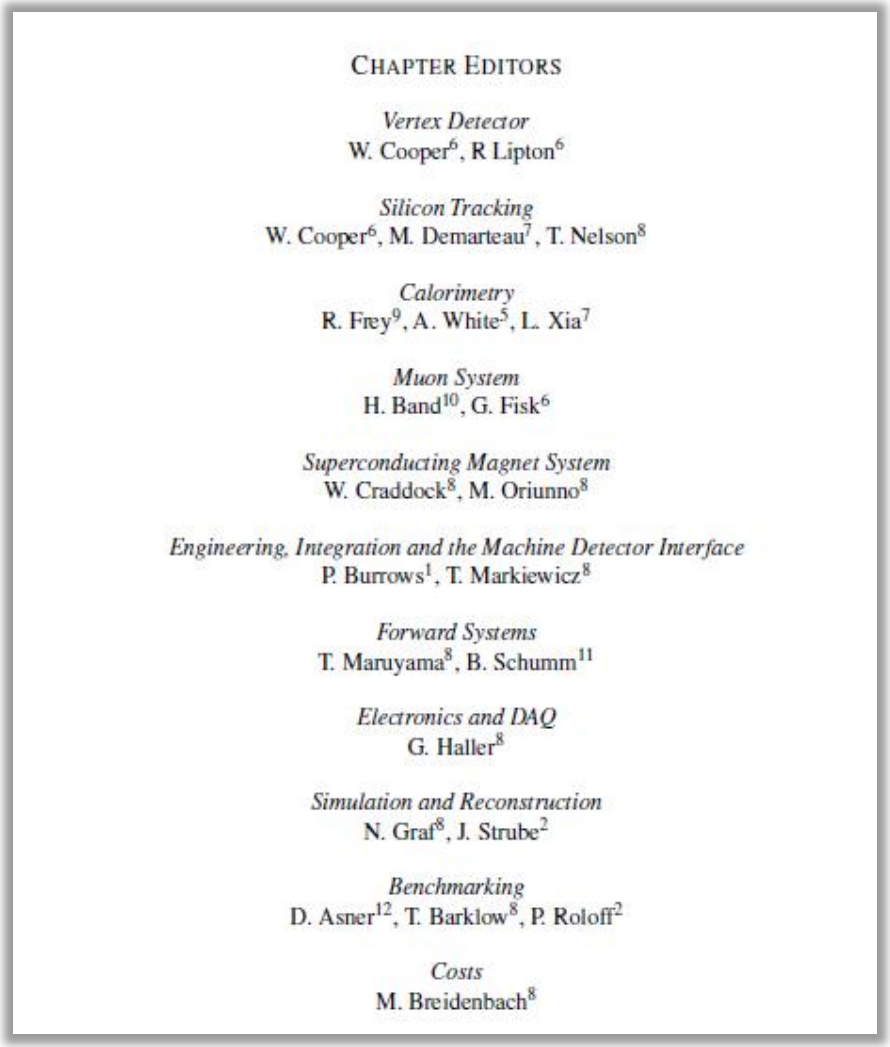
Phil Burrows

Lucie Linssen

Mark Oreglia

Marcel Stanitzki

A. W.



CHAPTER EDITORS

Vertex Detector
W. Cooper[6], R Lipton[6]

Silicon Tracking
W. Cooper[6], M. Demarteau[7], T. Nelson[8]

Calorimetry
R. Frey[9], A. White[5], L. Xia[7]

Muon System
H. Band[10], G. Fisk[6]

Superconducting Magnet System
W. Craddock[8], M. Oriunno[8]

Engineering, Integration and the Machine Detector Interface
P. Burrows[1], T. Markiewicz[8]

Forward Systems
T. Maruyama[8], B. Schumm[11]

Electronics and DAQ
G. Haller[8]

Simulation and Reconstruction
N. Graf[8], J. Strube[2]

Benchmarking
D. Asner[12], T. Barklow[8], P. Roloff[2]

Costs
M. Breidenbach[8]

Sakue's Nine Points

•Demonstrate proof of principle on critical components.
When there are options, at least one option for each subsystem will reach a level of maturity which verifies feasibility.
•Define a feasible baseline design.
While a baseline will be specified, options may also be considered.
•Complete basic mechanical integration of the baseline design accounting for insensitive zones such as the beam holes, support structure, cables, gaps or inner detector material.
•Develop a realistic simulation model of the baseline design, including the identified faults and limitations.
•Develop a push-pull mechanism, working out the movement procedure, time scale, alignment and calibration schemes in cooperation with relevant groups.
•Develop a realistic concept of integration with the accelerator including the IR design.
•Simulate and analyze updated benchmark reactions with the realistic detector model. Include the impact of detector dead zones and updated background conditions.
•Simulate and study some reactions at 1 TeV, including realistic higher-energy backgrounds, demonstrating the detector performance.
•Develop an improved cost estimate.

Ongoing R&D for SiD

We will hear R&D some updates at this meeting.

We hope to hear from DoE on the (re)review of the LCDRD request.

We should review the R&D goals and priorities we set recently for the LCDRD submission.

U.S. – Japan program?

Future of SiD

(extract from a letter to Lyn Evans (July 2012))

Given this successful program to develop the SiD Concept , we would like to express **how we see the future path for SiD**. There are several aspects to this from the detector, physics, organizational, and resource perspectives. As a detector concept we strongly believe that, while technologies and/or their implementations may evolve over time**, SiD will remain an excellent tool for exploration of physics at a linear collider**. We therefore propose to further study and develop SiD as new information emerges in the Higgs and possibly other new physics areas. There are many areas of detector R&D that must be further developed and completed, followed by studies of specific implementations in a full technical design. In parallel, while a limited number of physics processes will be studied for the SiD DBD, there are many other processes that should be addressed in continued studies. **The sum of all these detector and physics activities points towards a lively and sustained effort on SiD as a well identified concept moving forward into the next phase of linear collider development**. We therefore see SiD as a vital element of the future program and a major component of the "Physics and Detectors" section of the new organization.

Future of SiD

Opportunity for input to Snowmass 2013 – how to organize SiD effort??

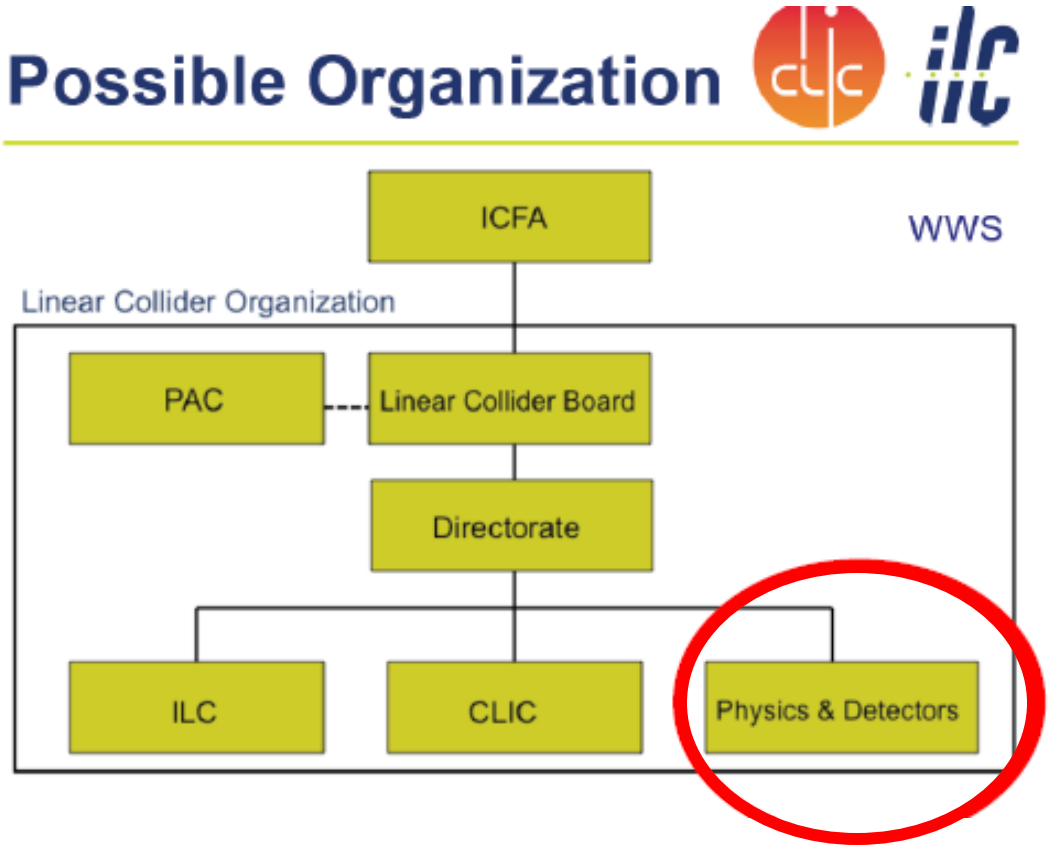
Several SiD people are already identified as convenors/contacts for Snowmass 2013.

Proposal from CLIC colleagues for SNOWMASS submission

We need to think about/discuss moves towards a Technical Design Report and forming a collaboration.

We also need to think about SiD in the context of the new LC organization:

Future of SiD



- How will SiD actually interact with LCO/AD/Physics and Detectors ?
- How will this affect interworking with CLIC colleagues?
- How will this affect our interactions with U.S. funding agencies?

Future of SiD - Japan

US and European scientists should throw their support behind the ILC project. For the forward-thinking Europeans, this means a clear commitment to the parts and manpower they might be able to supply. For the Americans, it would probably require a willingness to slow the neutrino programme. That may be hard for them to swallow but, deep down, US physicists know that participation in the ILC is the only real option if the nation is to remain at the vanguard of particle physics.

Statements of support from overseas will not guarantee that the ILC will go ahead. Japan's opaque government will still have to debate the programme's merits internally and come up with a process for committing to its construction. But an early show of support could give the collider the push it needs to get under way. That would be a great victory for Japan, and the world.

Nature 492, 312 (20 December 2012)

How can we/should we support this process??

Future of SiD - Japan

Our colleagues in Japan are seeking expressions of support.

We need to start a dialog that will lead to an understanding of the future role of SiD in an ILC in Japan.

Future of SiD

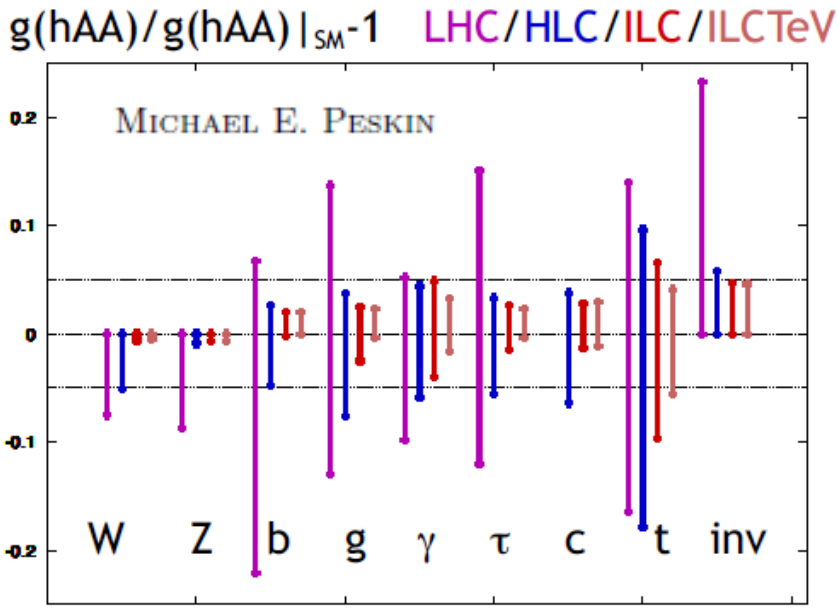
- The Higgs discovery is very fundamental to all of science and demands a full investigation and complete program of measurement of properties

- The LHC Higgs program (to 3 ab^{-1}) will be long and hard!

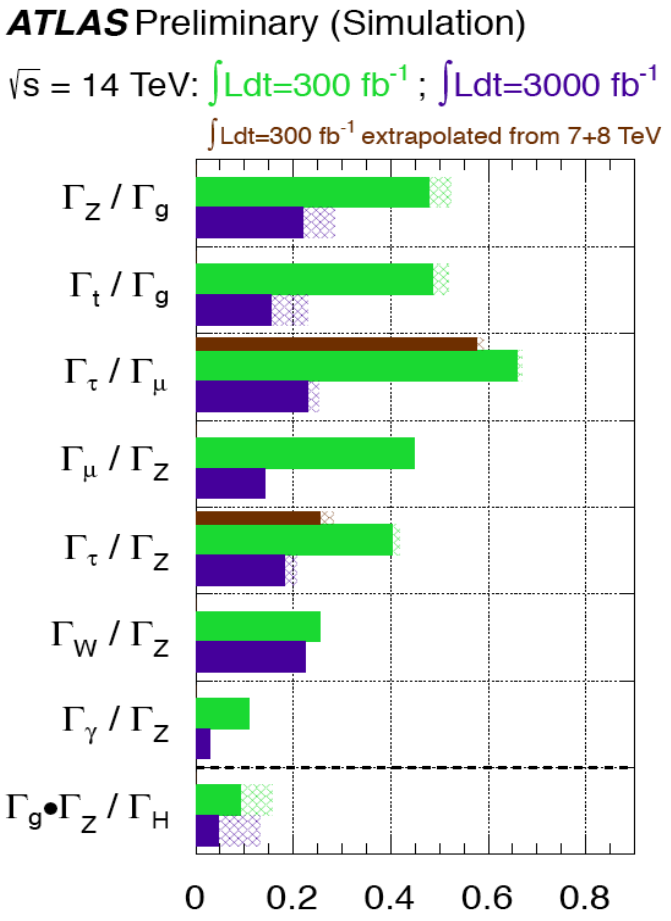
- We have always benefitted/learned from the complementarity between hadron collider and e+e- collider physics.

- How do we achieve a “balanced” U.S. HEP program with full participation in the exploration of the Higgs?

Higgs couplings



CMS Coupling	Uncertainty (%)			
	300 fb^{-1}		3000 fb^{-1}	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
κ_γ	6.5	5.1	5.4	1.5
κ_V	5.7	2.7	4.5	1.0
κ_g	11	5.7	7.5	2.7
κ_b	15	6.9	11	2.7
κ_t	14	8.7	8.0	3.9
κ_τ	8.5	5.1	5.4	2.0



Daniela Bortoletto – ANL Instrumentation Frontier WS

Charge to this Workshop

- Look at/work on the DBD sections that are relevant to you

- Critically review the benchmark results

- Talk to the relevant DBD editors

- Commit to providing missing sections, figures, etc.

- Discuss, join preparations for Snowmass 2013

- Express your opinions on the future of SiD, ILC in Japan etc.

- Enjoy !!

Extra

DBD Editors

Overall editors: P. Burrows, M. Stanitzki, L. Linssen, M. Oreglia, H. Aihara

Section editors:

SiD Area	Section editors
VTX	R. Lipton, W. Cooper
TRK	M. Demarteau, T. Nelson, W. Cooper
ECal	R. Frey, M. Stanitzki
HCal	A. White, L. Xia
Muon	G. Fisk, H. Band
FWD	B. Schumm, T. Maruyama
Magnet	W. Craddock, M. Oriunno
MDI	P. Burrows, T. Markiewicz
Sim/Reco/PFA/Perf.	N. Graf, J. Strube
Benchmarking	T. Barklow, P. Roloff
Cost	M. Breidenbach, K. Krempetz
Elect/DAQ	G. Haller

We have entered a new era!