



WORKSHOP CHARGE

F. RICHARD FOR THE WWS-OC



*International Linear Collider Workshop 2010
LCWS10 and ILC10*

The Hall of Supreme Harmony 太和殿

Outline

- ▣ Where we are
- ▣ What are the next steps to be discussed at LCWS10
- ▣ Influence of LHC start up
- ▣ LC Strategy

Introduction

- ▣ The LoI validation by IDAG has required a 'tour de force' from the community with beautiful results illustrating the physics potential of ILC
- ▣ We are now entering in the DBD phase which requires a careful **optimization of efforts** given the limited resources
- ▣ SiD and ILD are defining a strategy in common with detector R&D collaborations to achieve their **base line detectors** (with options for some sub-detectors)
- ▣ During this workshop these aspects will be discussed with IDAG which intends to accompany these efforts till 2012
- ▣ Also the SB2009 proposal has illustrated the need to tighten our links to GDE and this workshop will be an important step in this process

Beyond the Lols

- ▣ Questions are :
- ▣ Improved **realism** on detector studies (background, engineering aspects)
- ▣ How and when to restart **physics analysis** ?
- ▣ Consequences of **SB2009** on physics
- ▣ **Physics scenarios** in 2010-2012 ?
- ▣ What happens **after 2012** ?

Improved realism

- ▣ Realism of DBD will require **engineering**: detector integration, credible push-pull together with alignment issues
- ▣ Realism means understanding time stamping strategy, pulsing issues, influence of magnetic field, material, cooling, dead zones and this work is part of the ongoing **R&D effort**
- ▣ More realistic studies of backgrounds (not only beamstrahlung but also underlying $\gamma\gamma$ evts SR, neutrons from the dump, μ halo... which are very demanding for our **software**

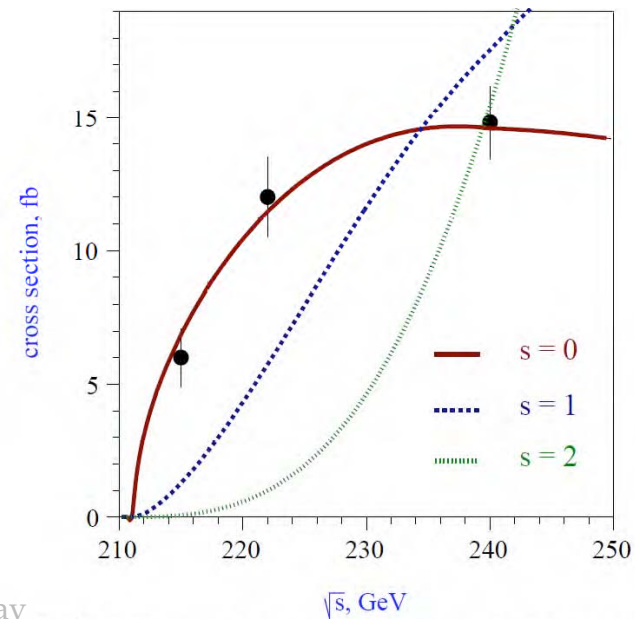
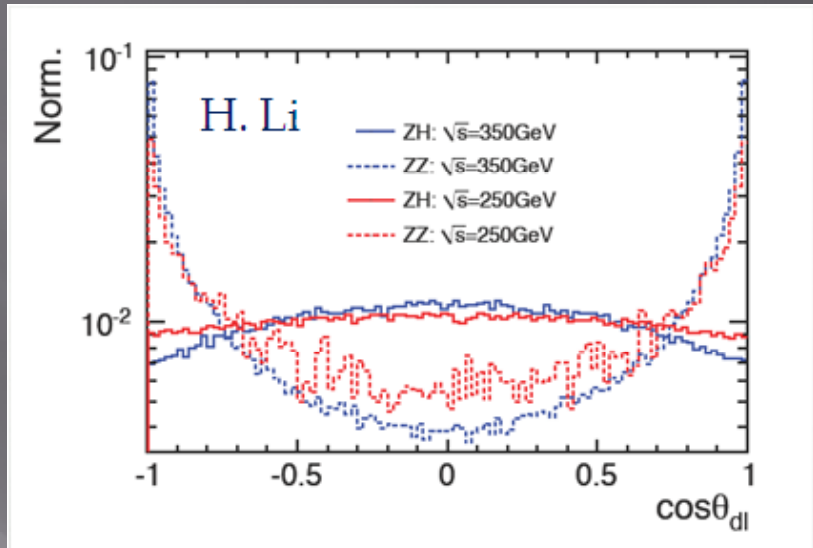
➡ Very large efforts which, given limited resources requires careful **prioritization**

➡ Note that lab Directors at ILCSC have reacted positively to RD demand for help

- ▣ Don't miss this opportunity !

SB2009

- Important event for this workshop: a process requiring tight connection between the Physics/ Detector community and GDE
- Again, realism: being cost-effective and least damaging to physics
- See plenary meeting with J. Brau et al tomorrow and MDI special session (on Sunday)
- We need to think carefully on possible tradeoffs
- Two issues :
- **threshold scan** or spin parity ? Plot shows dominance of $\sin^2\theta_Z$ over $1+\cos^2\theta_Z$
- How important is the **accuracy on mH** ? (40MeV-> 100 MeV)



Thresholds scans

- SUSY or other scenarios may require time consuming **threshold scans** at low energy to get the ultimate accuracy but it all depends on which physics will pop out LHC
- ILC should remain flexible to face real scenarios
- One issue is tradeoff between running time and construction investment (see LHC !)
- Examples of accuracies from TESLA with scans on δm

$\tilde{\ell}, \tilde{\nu}$	m [GeV]	δm_c [GeV]	δm_s [GeV]	$\tilde{\chi}$	m [GeV]	δm_c [GeV]	δm_s [GeV]
$\tilde{\mu}_R$	132.0	0.3	0.09	$\tilde{\chi}_1^\pm$	127.7	0.2	0.04
$\tilde{\mu}_L$	176.0	0.3	0.4	$\tilde{\chi}_2^\pm$	345.8		0.25
$\tilde{\nu}_\mu$	160.6	0.2	0.8	$\tilde{\chi}_1^0$	71.9	0.1	0.05
\tilde{e}_R	132.0	0.2	0.05	$\tilde{\chi}_2^0$	130.3	0.3	0.07
\tilde{e}_L	176.0	0.2	0.18	$\tilde{\chi}_3^0$	319.8		0.30
$\tilde{\nu}_e$	160.6	0.1	0.07	$\tilde{\chi}_4^0$	348.2		0.52
$\tilde{\tau}_1$	131.0		0.6				
$\tilde{\tau}_2$	177.0		0.6				
$\tilde{\nu}_\tau$	160.6		0.6				

Table 3.2.1: *Expected precision on masses, scenario RR1, using polarised e^\pm beams ($\mathcal{P}_- = 0.8, \mathcal{P}_+ = 0.6$). δm_c from decay kinematics measured in the continuum ($\mathcal{L} = 160 (250) \text{ fb}^{-1}$ at $\sqrt{s} = 320 (500) \text{ GeV}$) and δm_s from threshold scans ($\mathcal{L} = 100 \text{ fb}^{-1}$).*

Physics Analysis

- When and how to restart physics studies? Again, issue is limited manpower and hard work needed to complete such analyses
- While R&D on subdetectors will go on till 2012 and beyond, a choice of a **stable and realistic baseline detector** needs to be finalized soon to re-start physics studies (long process for full simulation/reconstruction)
- This does not mean of course that we need to freeze our choices since R&D will go on providing new elements. More than one sub-detector type can/will be allowed.
- Which type of Physics analysis ?
- Select reference reactions for their interest and to test detector performances: e.g. cover **1 TeV physics** (parameters ?)
- Proposal from Physics panel (see talk of Keisuke Fujii) to be discussed between IDAG and the concepts
- Find an efficient way to provide **fast responses**: while full simulation of SM needed for reliable studies, simplification is possible for simple channels e.g. $H\mu\mu$

What can we expect to happen during 2010-2011 ?



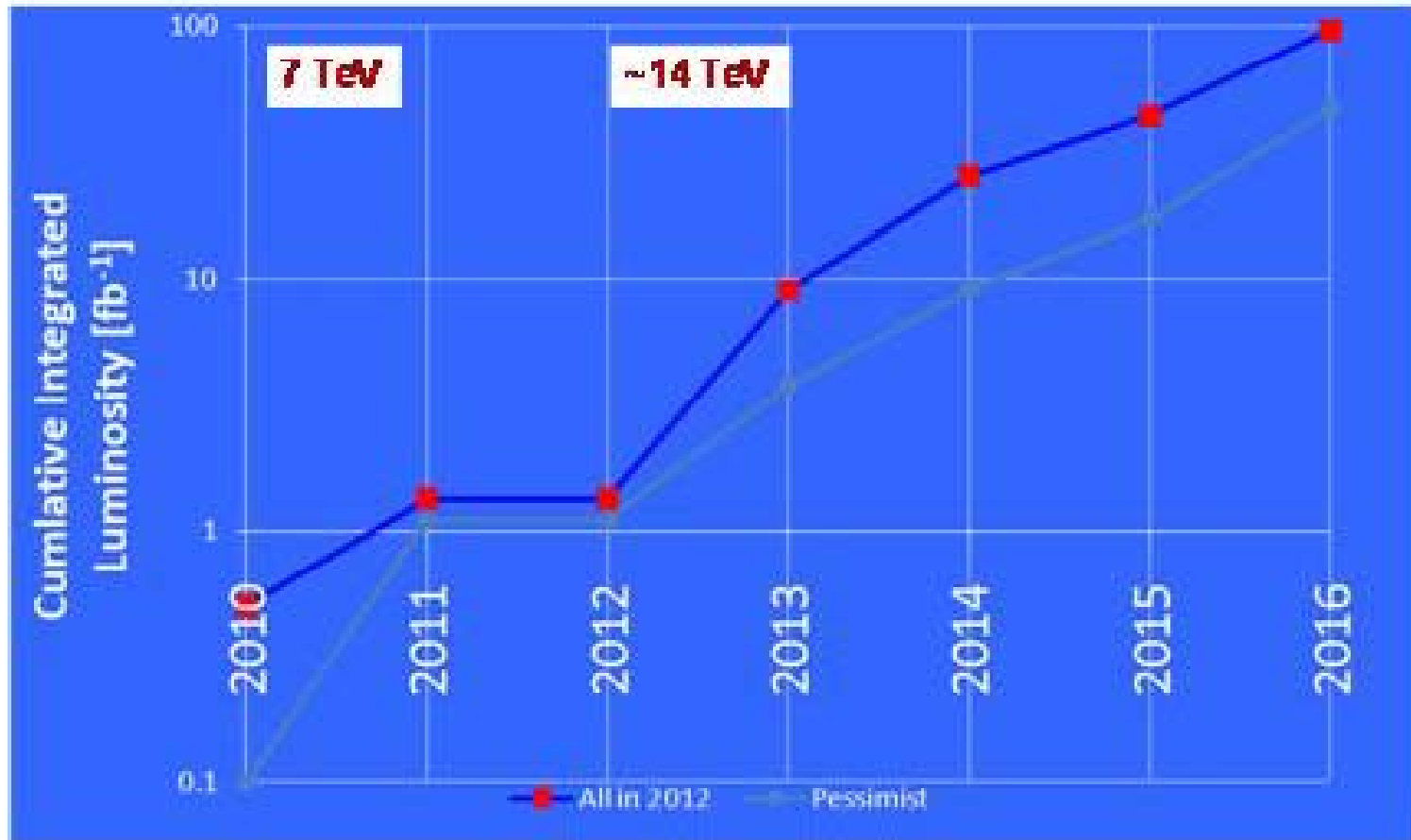


Scenario at LHC

- A successful start of LHC plays an essential role in our roadmap
- What can we expect in 2010-2011 ?
- **Hopes at LHC**: discovering **CMSSM** or an extra generation of quarks ($m_t' < 500$ GeV) is possible with low luminosity
- Moriond 2010: ATLAS/CMS have a discovery potential for **SUSY** signatures with gluino and squark masses up to **600 / 700 GeV** for 200 pb⁻¹ at $\sqrt{s} = 10$ TeV ($\approx 700/800$ pb⁻¹ for $\sqrt{s} = 7$ TeV) to be compared to **300-400 GeV** at Tevatron
- This covers a large fraction of the so-called CMSSM/NUHM1 predicted spectrum (fit from observables)
- Also sensitivity to Z' up to 1.5 TeV



LHC planning for the coming years, as a result of 'Chamonix 2010'



Marion D. EW, 7- March 2010
Peter Jenni [CEBN]

Note: the scale labels indicate the end of the year

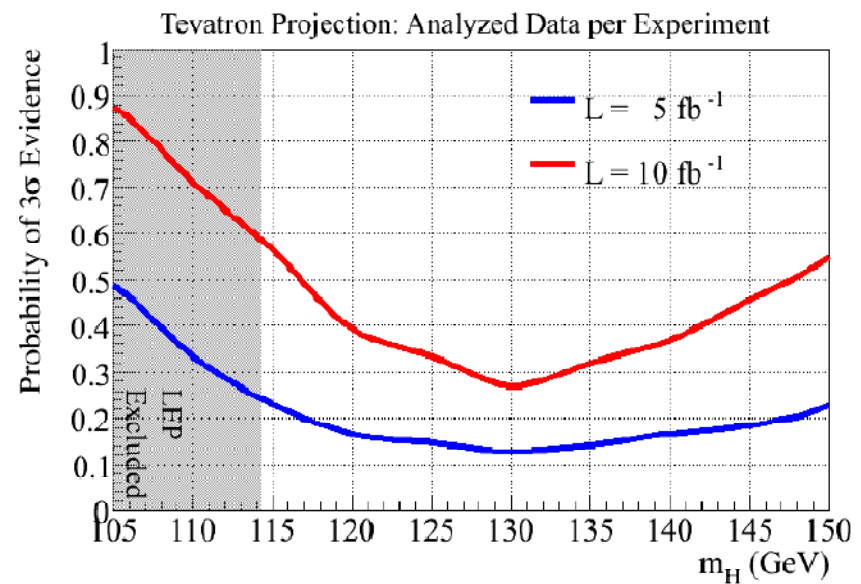
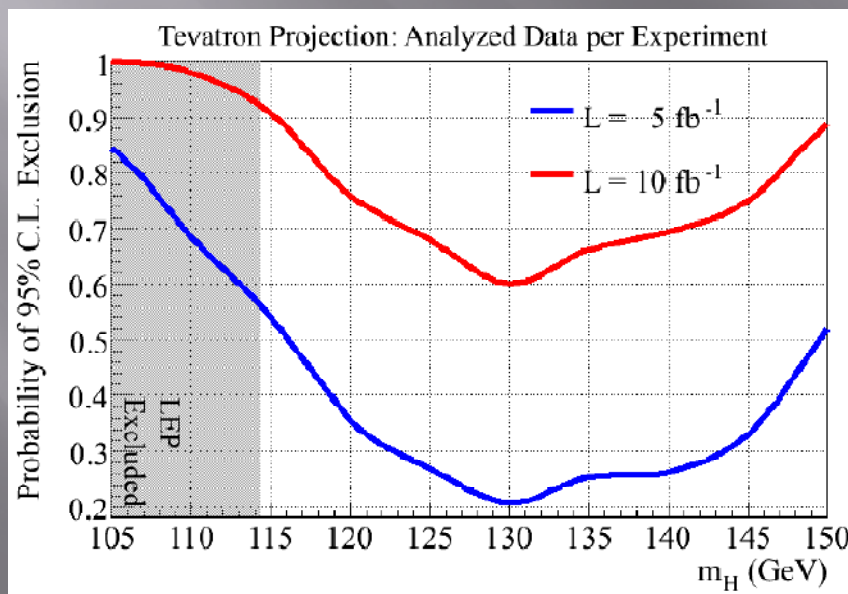
Discussions at Hadron Collider

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Higgs

- LHC will reach the appropriate sensitivity on Higgs
~end 2013
- Tevatron can exclude or hint a light Higgs end 2011



Strategy for DBD

- ▣ Strategy of SiD and ILD for DBD in 2012 reported to RD and discussed with IDAG
- ▣ **Limitation in resources, regional unbalance** are serious concerns

➔ Sharing of resources at all levels is mandatory

➔ It is important to have the best **ILD-SiD connections** (Harmony !) to set up **common goals** and share efforts (software, engineering, MDI)

➔ Careful planning of R&D efforts, test beam strategy

- ▣ **CLIC-ILC connections** for mutual benefits e.g. coil, software effort (physics > 1 TeV), R&D, engineering here also avoiding duplication of efforts

➔ **CLIC-ILC panel** will start at this meeting

The international landscape

- ▣ **What comes after 2012 after machine TDR and Detector DBDs ?**
- ▣ Questions debated at ILCSC/ICFA/FALC but the **community** should manifest its opinions through RD and the WWS co-chairs



See report J. Bagger at the end of this workshop + presentations of A. Suzuki and R. Heuer

- ▣ Major ongoing effort in the preparatory phase for a machine and also siting, governance...
- ▣ How to go from the present political stage (FALC) to a higher one, of the **intergovernmental** type (comparable to the ITER approval process) ?
- ▣ Etc...
- ▣ These issues are vital to insure a credibility of our project

Conclusions

- ▣ Major effort in front of us to reach our objectives by 2012
- ▣ This workshop is important to define an optimum strategy given our limited resources
- ▣ Our community needs clear messages about the future ASAP
- ▣ LHC may provide early messages in spite of a slow startup
- ▣ ILC should not miss this opportunity

BACK UP SLIDES

