

ILD workshop

119 participants (including last minute registrations which are not on the WEB)

2 days of contributions

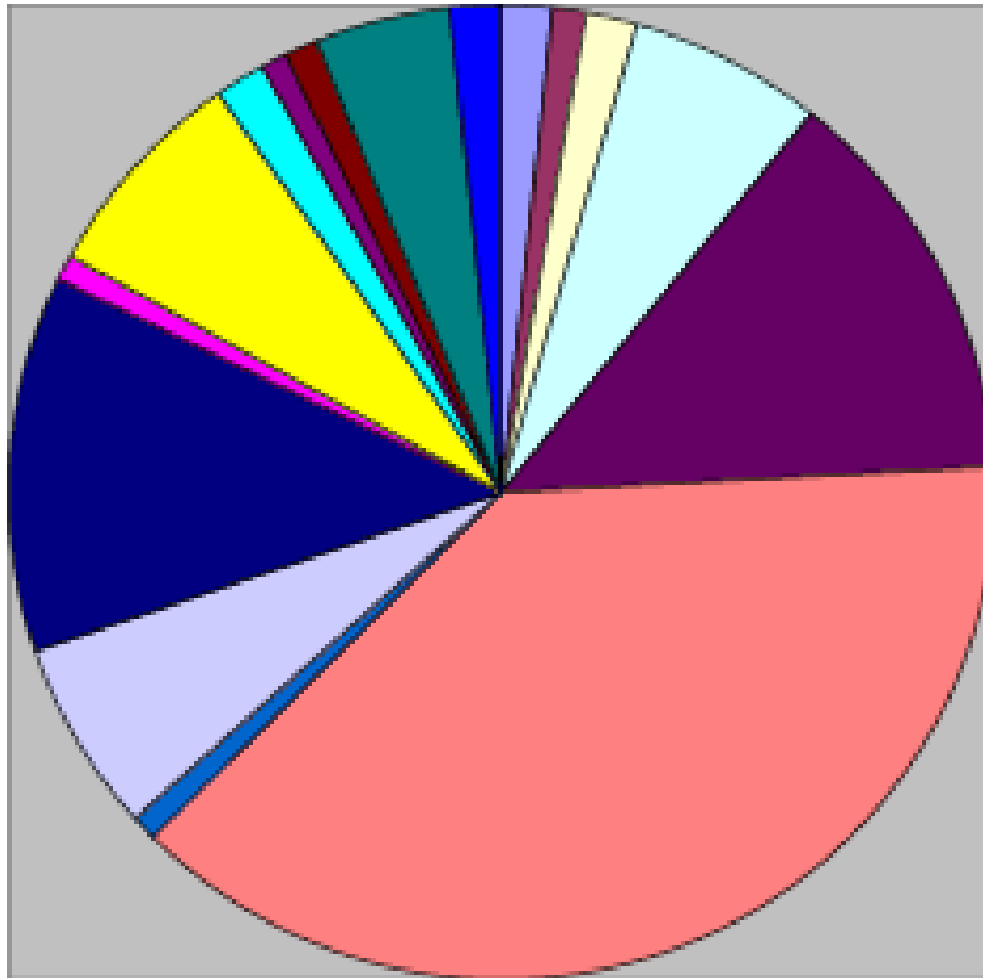
lively discussions, which had to be cut short in some cases (sorry)

(as always there are not enough slots for contributions, and time for discussion suffers)

Many thanks to the speakers and participants!

Countries of participants

Count of Country



Country
AUSTRIA
BELARUS
CANADA
CZECH REPUBLIC
FRANCE
GERMANY
ISRAEL
ITALY
JAPAN
NETHERLANDS
POLAND
ROMANIA
RUSSIA
SPAIN
UNITED KINGDOM
UNITED STATES OF AMERICA

Coverage of benchmarks

Channel/Area	Topic	Groups
$e^+e^- \rightarrow Zh$	Recoil mass l^+l^-X	DESY-Zeuthen/MPI, LAL, Niigata, Tohoku
	Branching Ratio	Edinburgh? , Bristol?
	Direct mass	DESY-Zeuthen/MPI, Shinshu
	Heavy Higgs	DESY
$e^+e^- \rightarrow Zhh$		RHUL
$e^+e^- \rightarrow$ selectrons		MPI
$e^+e^- \rightarrow$ smuons		MPI, DESY, Tokyo
$e^+e^- \rightarrow$ stau stau		DESY, RHUL, LPNHE-LAL
$e^+e^- \rightarrow WW$	PFA	DESY
$e^+e^- \rightarrow WW\nu\nu/ZZ\nu\nu$	PFA	Cambridge, DESY
$e^+e^- \rightarrow tt$	6 jet final states	RAL?
	ttZ tbW vertices	Krakow
$e^+e^- \rightarrow \chi^0\chi^0 / \chi^+\chi^-$		Tokyo
tth		Saga
$e^+e^- \rightarrow HA$		LBNL
de/dx	meta-stable staus	DESY
Single photons	rad. χ^0	DESY
$e^+e^- \rightarrow cc$	c-tagging/vtx charge	LBNL
Vertex Charge	c cbar/ b bbar	Oxford
$e^+e^- \rightarrow \tau\tau$		
Kinks	GMSB	

MDI/ Integration

- Intense discussions:
 - 2h + 2h on Tuesday
 - 2h on Wednesday
- Worked on MDI/Integration task list → most tasks are being worked on!
- Discussed CAD formats and exchange mechanisms
- Discussed technical coordinators
 - Japan: H. Yamaoka (KEK)
 - France: M. Joré (LAL, tbc)
 - DESY: K. Sinram (tbc)
- Next phone meeting (tba) will concentrate on B-field issues, optimisation WG will be invited!

List of Issues/Tasks for ILD MDI/Integration

1. IR Issues/Tasks

1.1 IR design optimization with engineering studies

- beam pipes, pumps, wakefields
- innermost radius of VTX and B-field
- outer radius of support tube and inner radius of TPC
- calorimeters, pair monitor and beam instrument

1.2 Background estimation

- pairs v.s. B-field, (anti-)IDD
- muons v.s. muon spoilers, collimation depth
- synchrotron radiations v.s. collimation depth, masks
- neutrons from pairs, extraction line and dump v.s. mask

1.3 Relevant parameters for IR optimization

The relevant parameters are listed in a following table, where differences will be studied and tried to be understood.

machine parameter set	GLD and GLDc		LDC
	1TeV, HLam-1	same in GLDc	nominal?
L* (m)	4.5	4.3	4.3
B (Tesla)	3	3.5 in GLDc	4
R _{eq} (cm)	1.5	z < 5cm	1.4
R _{VTX} (cm)	2.0	FPCCD	1.6
VTX angular acceptance	cos < 0.95	3 super-layers	cos < 0.952
R _{FCAL} (cm)	8	z = 2.3m	7.6
R _{BCAL} (cm)	1 and 1.8	z = 4.3m	1.3
support tube	cantilever 70cm dia.	10cm ² W-tube	cantilever 58cm dia.

Some parameters do not have the same meaning in GLD and LDC. For example R_{eq} for TPC is the limit between TPC and SFT for LDC. In the case of GLD it is the inner radius of the sensitive part of the TPC, with the same definition LDC would be 36cm. We should first agree on definitions.

Common parameters have been suggested by the detector optimization working group as listed below.

Detector concept		GLD	LDC	GLD'	LDC'
TPC	R _{eq} (m)	0.45	0.3	0.45	0.3
	R _{out} (m)	2.0	1.58	1.8	1.8
	Z _{max} (m)*	2.5	2.25	2.35	2.35
Barrel	R _{eq} (m)**	2.1	1.6	1.85	1.82
	Material	Sci/W	Si-W	Sci/W	Si-W
Endcap	Material	Sci/W	Sci/Fe,GaV/Fe	Sci/W	Sci/Fe,GaV/Fe
	Z _{min} (m)**	2.8	2.39	2.55	2.55
VTX	B-field (T)	3	4	3.5	3.5
	inner layer (mm)	20	16	18	18

* GLD Z_{max} = 2.3 + 0.2m for TPC readout which has been included in LDC.

** LDC has less radial space between TPC and ECAL.

*** Fixed ECAL Z_{min} is proposed for well-defined TPC endplate region.

1.4 Beam pipe design

- Vertex chamber
 - B-field, pair background, collimation depth (synchrotron radiation profile at IP) and neutrons with BCAL as mask
- In front of FCAL
 - Precise luminosity measurement with:
 - Beryllium or Aluminum straight pipe
 - smearing effect to be studied
 - Right angular SUS pipe
 - wake-field and minimum thickness for mechanical strength
- Pump
 - Background should be studied including electro-hadronic production in addition to bremsstrahlung process between beam and residual gas.
 - P > 10nTorr for no baking, no pump
 - P > 10nTorr for no baking with NEG pumps

1.5 Outer radius of support tube

- QD0 and SDO
 - compact superconducting magnets (B.Parker's design, 39cm dia.)
 - compact permanent magnets (Y.Iwashita's design)
 - anti-solenoid
 - installed in the same cryostat by B.Parker's design
 - support structure with fine adjustment
 - dynamic range of ±1mm and nanometer accuracy?
- Thickness of tungsten tube
 - LDC does not have a W tube anymore, the W is on the HCAL.

- GLD : minimum value for backgrounds in endcap CAL and Muon chambers
 - CFRP tube which has less Young's modulus than tungsten
 - Mechanical strength for supporting QD0,FCAL,BCAL and LHICAL
- Tracking in intermediate trackers between TPC and VTX
 - 4 layers for self-tracking capability in GLD
 - 2 layers for linkage in LDC

2. Detector Integration Issues/Tasks

2.1 Detector and its assembly on surface

- CMS-style assembly
 - coil support in the central ring, where the barrel part is divided into three rings
 - mechanical strength
 - B-field uniformity and leakage field

2.2 Iron structure

- deformation due to B-field
- thickness of iron yoke : 2.7, 2.8 and 2.15m for GLD, GLDc and LDC
- global shape : dodeca-, dodeca- and octa-gon for GLD, GLDc and LDC
- field uniformity and leakage magnetic field
- tolerances ?
- split of end-Yoke ?

2.3 Solenoid and cryostat design

- feasibility of (anti-)IDD in terms of engineering, cryogenics and B-field uniformity etc.
- how to wind coils and where ?

2.4 How to support inner detectors and QD0

- mechanical feasibility of cantilever system
- diameter of endcap hole

2.5 Opening, closing procedures

- requirement of experimental hall size and crane capacity
- GLDc : 31m x 120m x 33m (height) and crane of 100 tonnes
- Crane size largely affects the size of experimental hall.
- max 6m for detector endcap door opening in GLDc

2.6 Underground hall requirements

- where to put electronic trailers, need for service caverns
- temperature, humidity stability, the gradient

- utility (power, cooling water, gases, cables etc.)
- safety for fire, earth quake

3. Push-Pull Issues/Tasks

3.1 Re-commissioning machine operation

Re-commissioning process has been identified by T. Okugi (KEK) as listed below:

1. Initial alignment less than 1mm (long, 3 mm)
2. Beam Based Alignment (BBA) of QD0 relative to upstream beam line
3. IP position scan for collision between 2 beams
 - the major task and the most time consuming item !
4. Luminosity scan by changing SDO transverse position
5. beam size tuning by sextupole (SDO, SF1) knob

He suggested movers each for QD0,SD0 as well as QF1,SF1 .

3.2 Alignment of VTX and QD0

1mm displacement could happen. Is it tolerable ?
Or, fine adjustment system is needed in VTX ?

3.3 Slow settlement (100µm/month is tolerable ?)

Is it tolerable ?

3.4 Radiation, shielding around beam line

We could ask experts, e.g. T. Sanami (KEK), for estimation of self-shielding property of ILD .

3.5 Cryogenics system for solenoid, QD0

What, how and where ?

3.6 Commissioning during assembling/surviving detectors

stability, safety in the interference

3.7 Large platform scheme

H. Yamamoto suggested it in terms of stability and reproducibility.

Structure of ILD

General Assembly

Executive board:
JSB + contact people

Subdetector contacts

- VTX
- SI
- TPC
- CALO
- Muon
- FCAL
- DAQ
- ...

Working groups

- Optimization
- MDI
- cost

JSB

Group structure

- ILD structure
 - **Working groups:**
 - Optimization (Thomson, Tamaki)
 - MDI (Buesser, Tauchi)
 - Cost (Videau, Maki)
 - **Subdetector contacts:**
 - VTX
 - Silicon tracking
 - TPC
 - ECAL Si-W
 - ECAL Szintillator
 - HCAL analogue
 - HCAL digital
 - Muon
 - Forward (FCAL)
 - DAQ
 - Software
 - Coil?

Names for subdetector contacts are currently being determined.
Need people who look beyond their own R&D interests, and can represent the entire field.

Candidates for technical coordinators have been proposed

Remark: regional balance..

how can we make sure that we have this?

Decisions

To operate efficiently we need a procedure to take decisions

We propose the following decision path

- 1) As much as possible, the subdetector / technology groups should work out proposals for needed decisions, and propose solutions
- 2) If needed different subdetector groups should interact with each others to sort out interdependencies, and agree on common proposals
- 3) If no agreement can be found, the JSB will participate in the discussion
- 4) The final decision for ILD will be with the executive board, after (for important points) a process of consultation and discussion with the general assembly

Schedule

The schedule is of course under discussion,

but

we propose the following approach:

- Continue as much as possible towards the goal of a LOI
- Maintain the deadline of summer 08 to define ILD and have first results available
- We are prepared to accept a new schedule if this is proposed by the RD but we are not pushing ourselves for a significant delay

We are very concerned that we continue to have a strong US involvement

We are depending on a continuing participation of the UK colleagues

We are prepared to accept delays if this facilitates the broader participation

Meeting schedules

- Sendai (March) during / after the Sendai meeting: 1.5 days
 - Dedicated MDI meeting during Sendai meeting
 - Meetings of R&D collaborations before/ after Sendai? LCTPC, SiLC, others
- Warsaw (June): ECFA meeting, 1 day?

- Regular phone meetings
 - Optimization group (approx. bi-weekly)
 - MDI group

We will need a full general assembly (like the Zeuthen meeting) before we fix the ILD layout

- The rest will depend on the schedule of the LOI
 - LOI - 5 month: have editorial board in place and functional
 - LOI - 2 month: have first draft version ready for circulation
 - LOI - 1 month: have reviewed version ready, start finalization

Depending on the LOI schedule we should try to use appropriate ILC meetings to discuss the LOI face-to-face

Is this too ambitious?

LOI

The LOI is short: ca 100 pages:

not a lot of detail can be given
in particular analyses need to be covered in very abbreviated form

we need a good backup by detailed notes on each analysis:

proposal: for an analysis to be included in the LOI a note (internal)
should be available in time for the LOI

(e.g., Lcnote, preprint, or we setup our own ILD series of notes)

LOI structure

JSB is the main editorial board for the LOI

strong support group is needed who contribute material:

should be organized around the subdetector contacts.

I would suggest the subdetector contacts are asked to nominate one main editor for the subdetector section.

The LOI will (see Hitoshis presentation) have different options for technologies wherever it makes sense

we do not want to be exclusive at this point.

Sharing information

Organizing working in ILD;

we need to find a way to store, manage and make accessible material on ILD (drawings, pictures, tables, etc etc)

Proposal:

- Base this on the EDMS system in use for the accelerator
- Have to discuss which CAD system to use
- Ideally we should do the same for integration, subdetectors etc

As usual: common tools are very important!
We should not underestimate this!

ILD Web presence

Main WEB page:

<http://www.ilcild.org>

is now online in its new version (plone based, hosted at Triumph)

Content needs to be added by the different groups/ tasks, etc

Contact Dean Karlen for help

Mailing lists:

managed by DESY mailing list manager, accessible from WEB page
please subscribe yourself to the lists, if you have not already done.

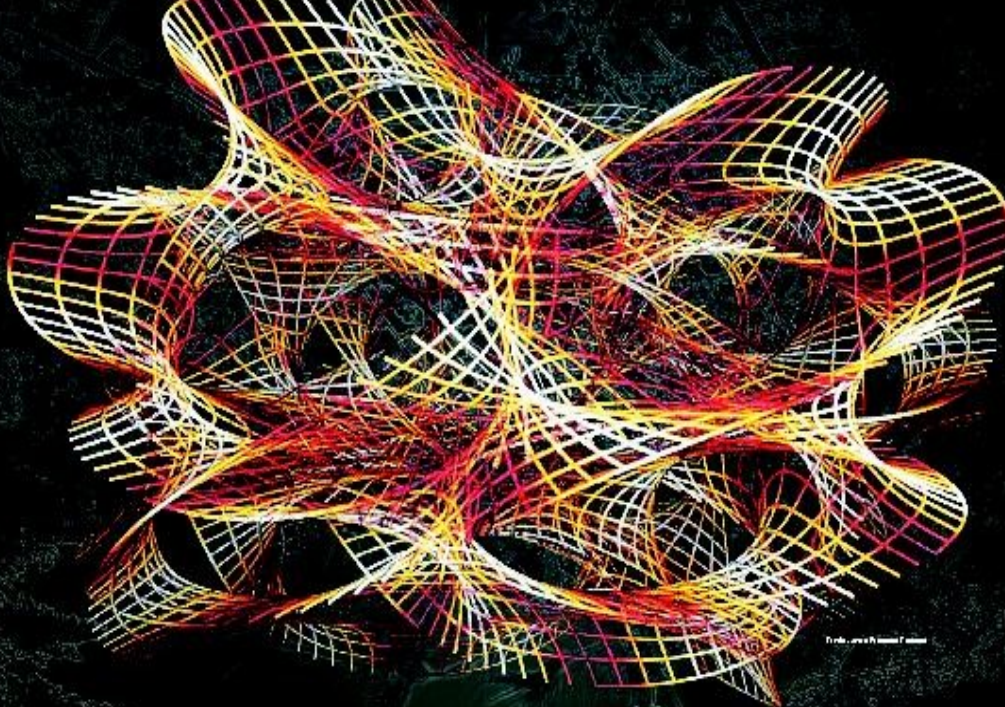


Photo: AWA/Tohoku Univ.

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TILC08

Joint AWA Physics and Detector Workshop
and GCE Meeting
on the International Linear Collider

March 3-6, 2008
Sendai, Japan

<http://www.awa.tohoku.ac.jp/TILC08>

