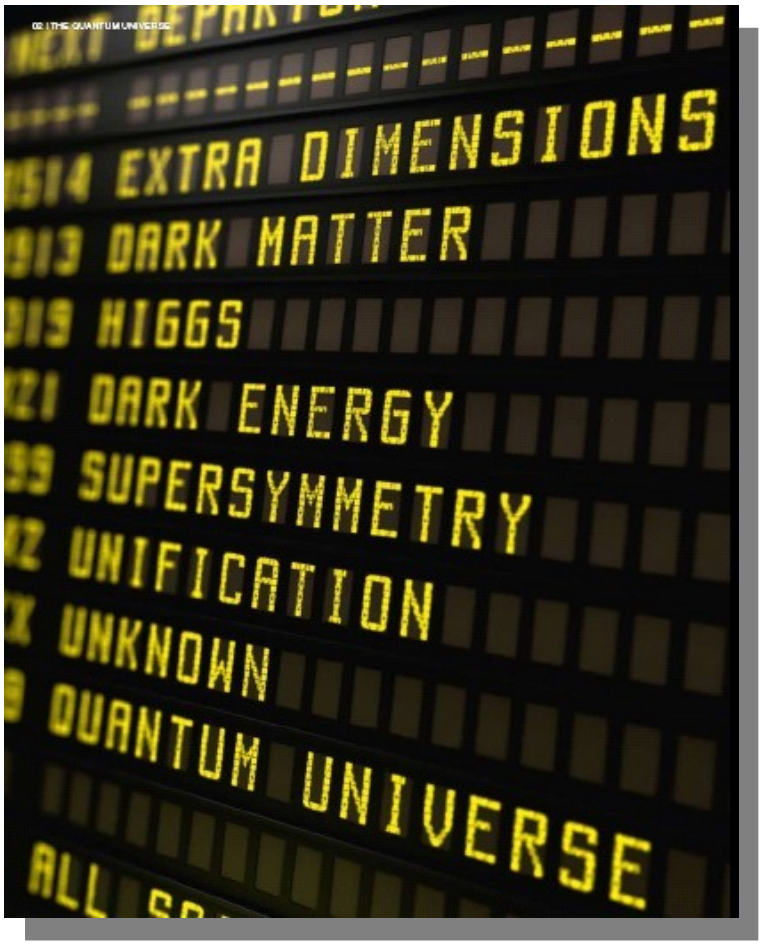
The LOI process at the ILC

ILC project meeting at DESY, 7.12.2007
Ties Behnke, FLC

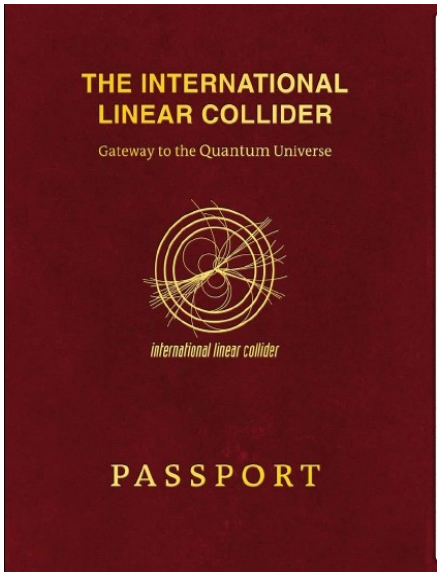
- What is it?
- Why?
- Organization
- DESY's role, ILD etc



The ILC Reference Design Report

August 2007: Reference Design Report has been published:

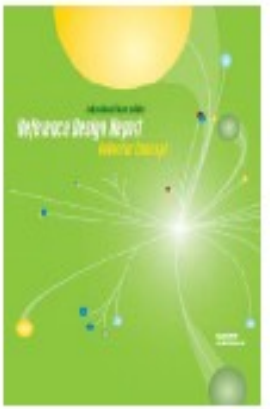
4+1 Volumes:



Executive Summary

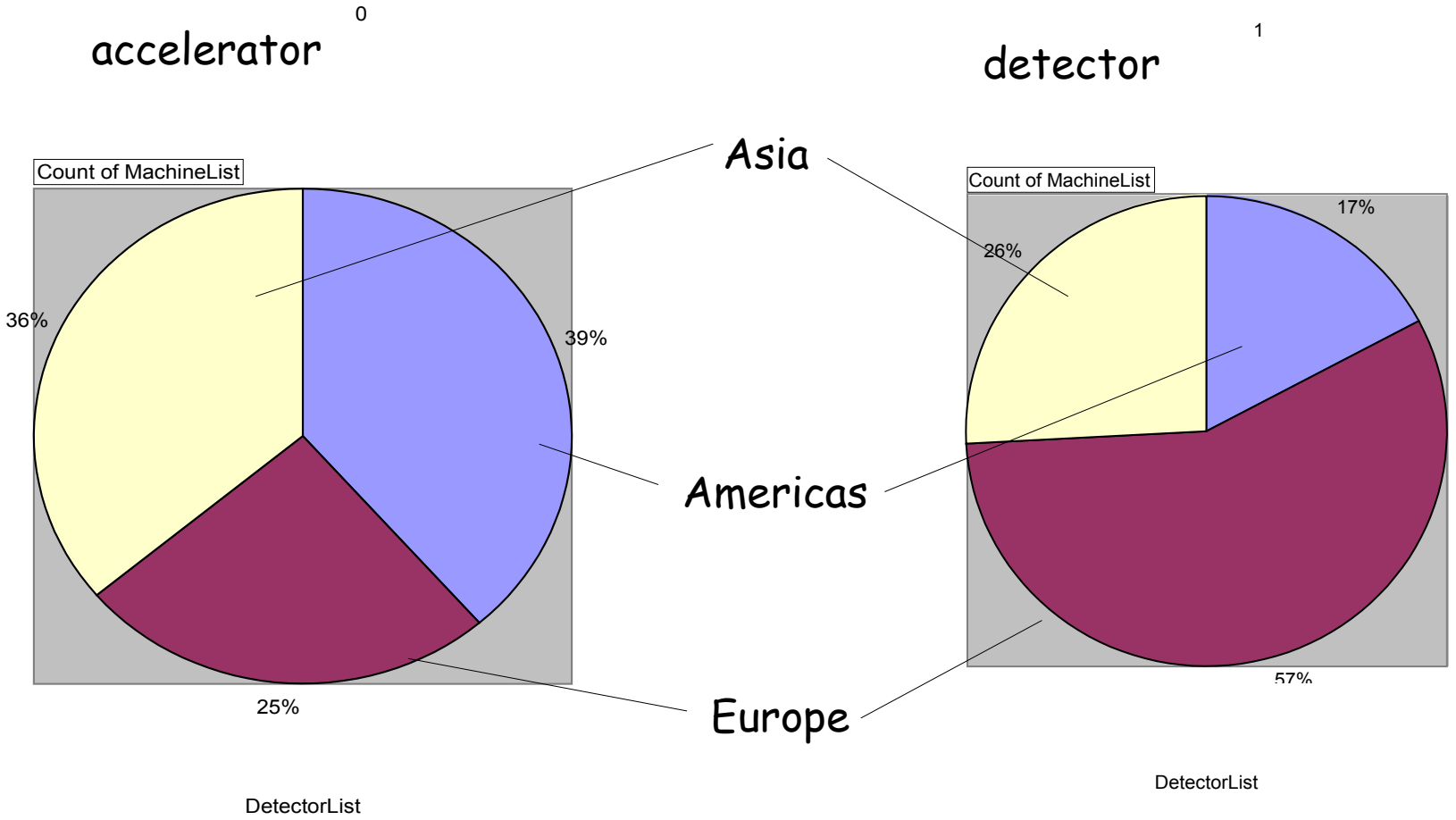
Physics at the ILC

Accelerator



Detectors

Just a remark: people



Close to 2000 people have signed the RDR

The next steps/ time scales

Letter of intent
1. Oct 2008

Engineering Design Report (EDR) 2010

Concept groups form, prepare letter of intents for an experiment at the ILC

IDAG (international detector advisory group) reviews LOI's and recommends 2

ILC Research Director (S. Yamada)

Major emphasis of the work will be on an optimization of the detector concept
and conceptual engineering work

Strong contribution by DESY people

Work will shift towards more real engineering and real solutions

(but will be "lightweight" due to resources)

Resources need to be found (EUDET2?)

The next steps/ time s

Letter of intent
1. Oct 2008

Concept groups
form, prepare
letter of intents
for an experiment
at the ILC

IDAG
(international detector
advisory group)
reviews LOI's
and recommend

Results from the
Detector R&D
expected ~2009-2010

eport (EDR)
2010

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Wo shift towards more real
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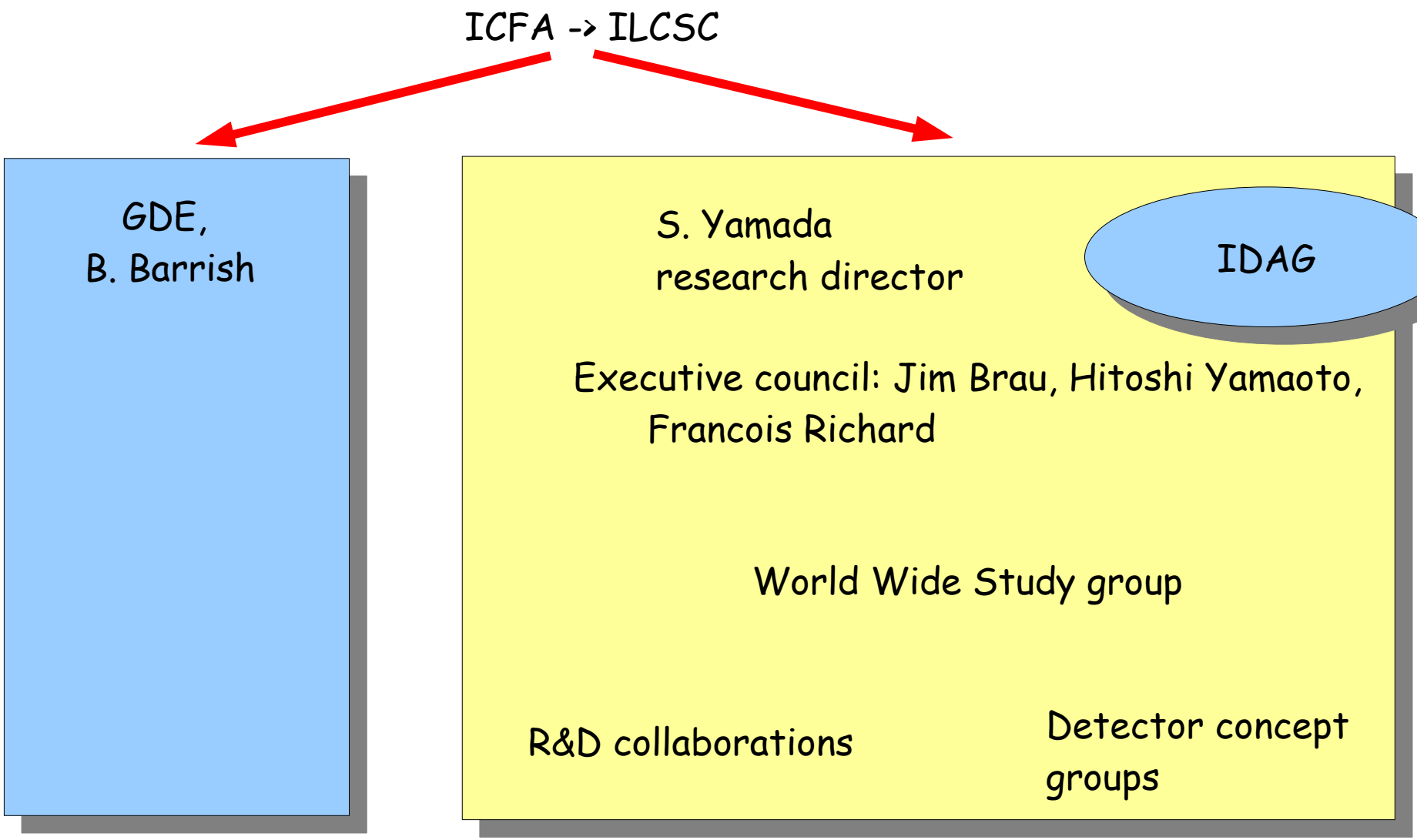
The Detector "Organisation"



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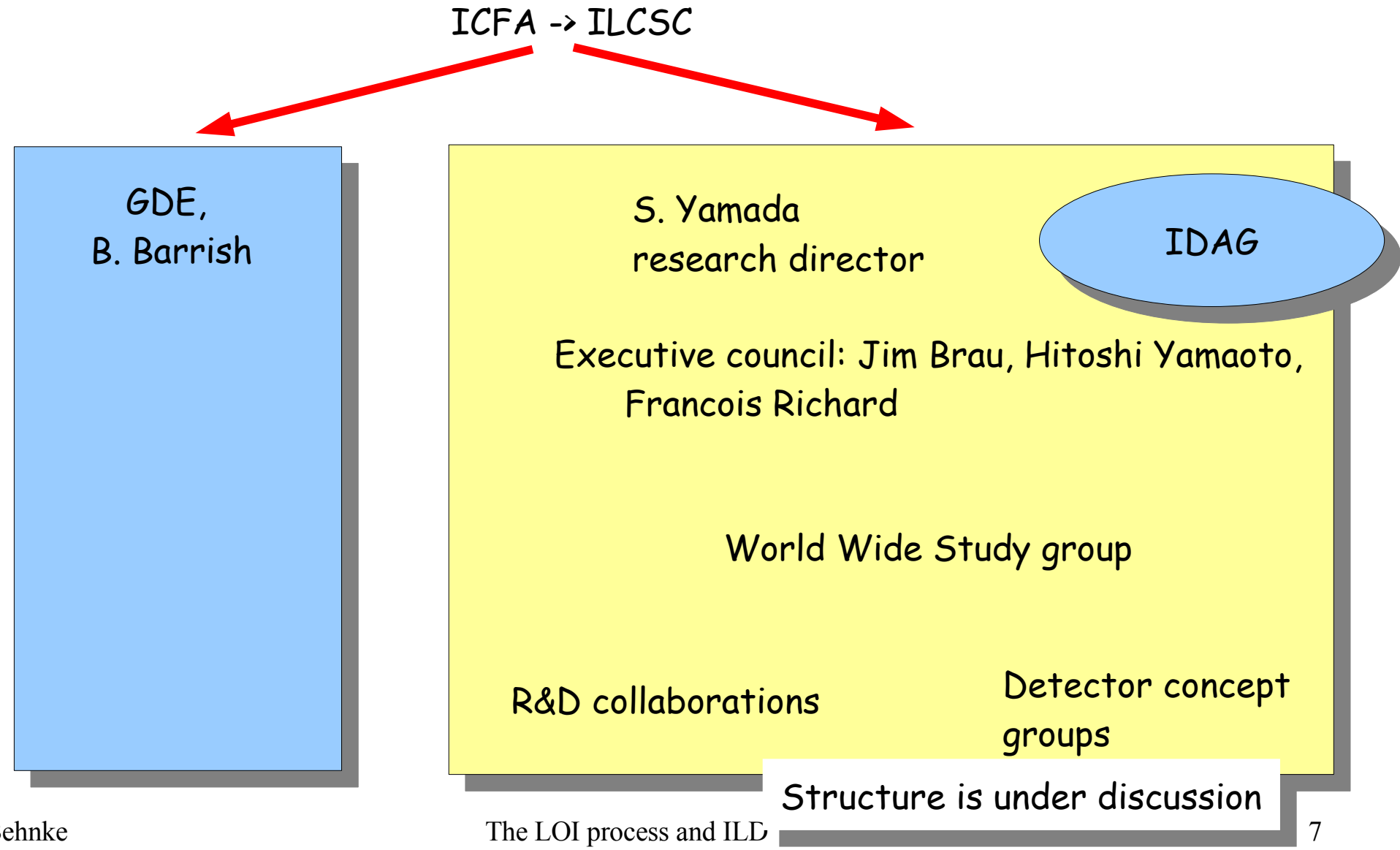


The LOI process

Boundary conditions:

LOI should be submitted on October 1, 2007, not more than 100 pages

Shorter than DOD or DCR!

LOI will be the basis for the review of the concepts by the IDAG + research director, with possible recommendations for a further down select to 2 concepts.

Content of the LOI

These are first thoughts – they are preliminary, incomplete, maybe wrong

Focus of the LOI:

make the point that an ILC detector can do the ILC physics extremely well

- need to convincingly demonstrate the performance
- need to illustrate the power through a number of different physics driven examples
- demonstrate that we have a community supporting this concept which is strong enough to bring the concept to a fully engineered proposal.

The LOI is:

To do this the LOI needs:

Show a proposed detector which includes a realistic layout, realistic technologies

A broad range of physics analyses supporting the design of the detector

The proposed detector should be "optimised" on scientific grounds, wherever possible.

The LOI probably is not:

We do not want to repeat the work done in the DOD's for the concepts

For the LOI, probably there will be comparatively little detail on the technical implementation of sub detectors etc.

We will rely on the DOD's for detailed documentations of these, plus updates (possibly in separate documents) where needed

The LOI is not the EDR – there seems to be some confusion at times.

Where do we come in?

Strong role in LDC detector concept (used to be TESLA detector)

now evolving towards the ILD detector concept

Based on strong groups in detector R&D:

- CALICE
- LC-TPC
- MAPS
- FCAL

Significant contributions to core software developments

ILD: GLD and LDC

Starting point: the GLD (mostly Asian) and the LDC (mostly European) concepts

	LDC		GLD	ILD ?
Tracker	TPC		TPC	TPC
R =	1.6 m		2.1 m	1.5–2.0 m ?
B =	4 T		3 T	3–4 T
ECAL	SiW		Scint	SiW or Scint
HCAL	Steel	RPC / Scint	Scint	yes

ILD Organisation

Joint Steering Group

Yasuhiro Sugimoto Hitoshi Yamamoto	Ties Behnke Henri Videau	Graham Wilson Dean Karlen

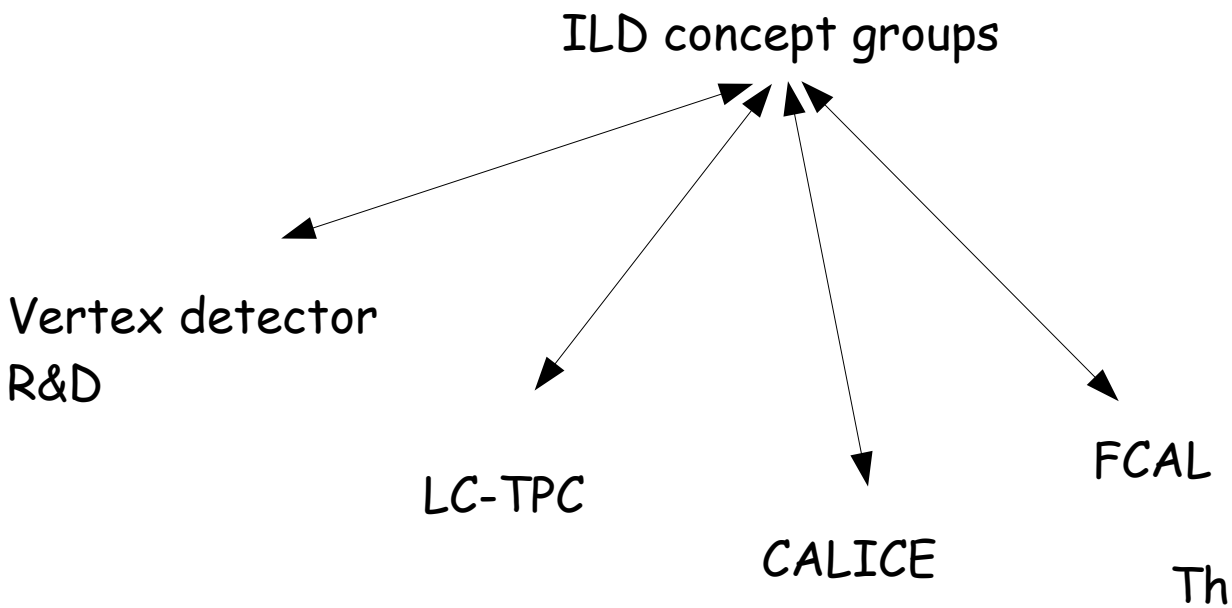
Working groups:

optimization	MDI/ integration	costing
Mark Thomson Tamaki Yosioka	Karsten Buesser Toshiaki Tauchi	Akiro Maki Henri Videau

Soon to be established: contacts to the different R&D collaborations

The ILD Organization

Where is the conventional structure (sub-detector groups, etc???)



Will soon need to identify names of people who are the liason

others?

This is enough for the moment, need to revisit after the LOI

The Goal

Optimization working group

"Investigate the dependence of the physics performance of the ILD detector on basic parameterssuch as the TPC radius and B-field. On thebasis of these studies and the understanding of any differencesobserved the WG, will make recommendations for the optimal choice of parameters for the ILD detector.It is the responsibility of the WG convenors to organize this work, while the steering board will assist them in executing the charge."

Goals:

1) setup the needed simulation tools to do a proper study

2) intiate and perform a first (rough) detector optimization so that we can freeze detector parameters by May 1

3) Contribute to the writing of the LOI and by making the case for the ILD

How to get there

We need a reliable and well working full simulation framework

MOKKA (LDC framework)

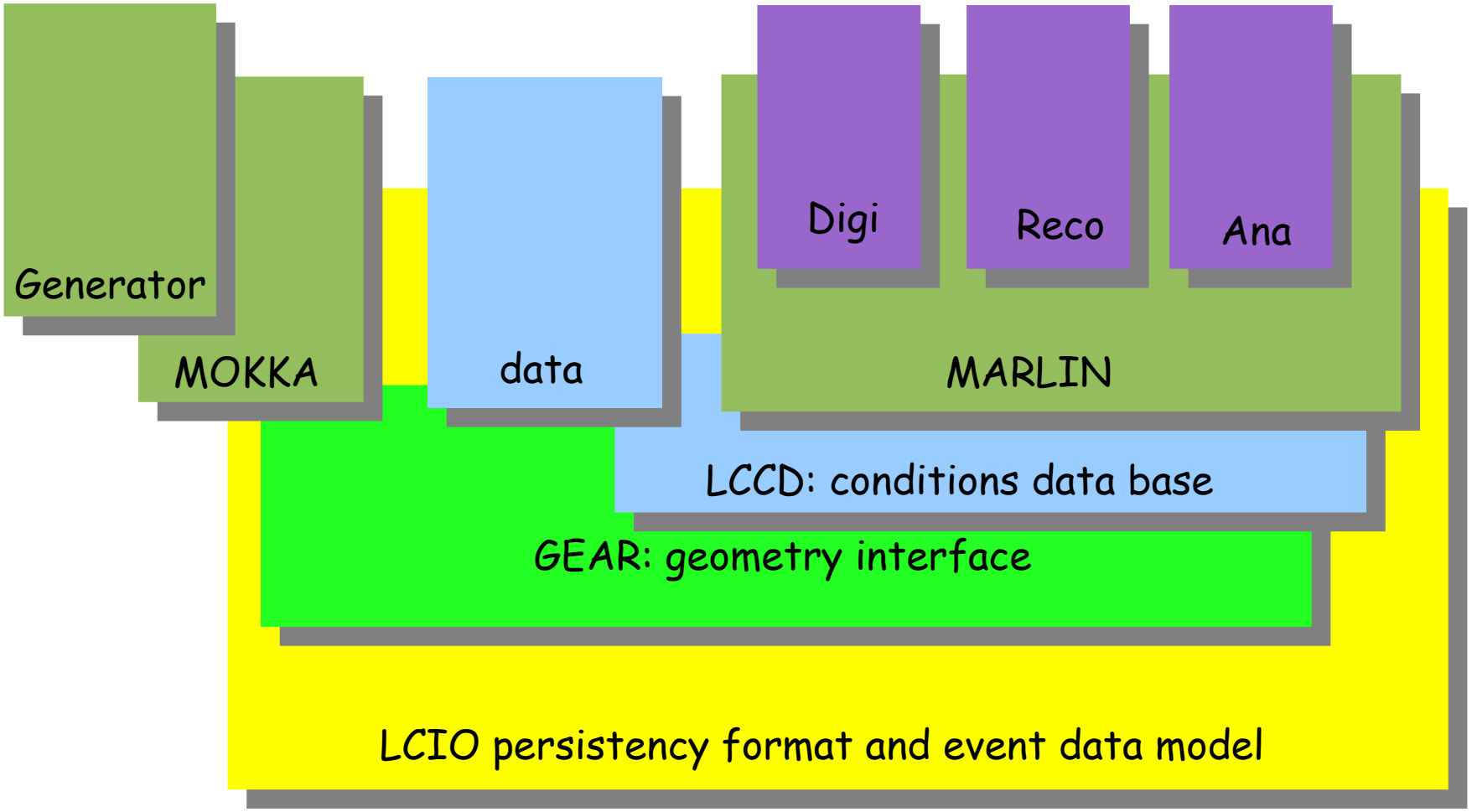
JUPITER (GLD framework)

No time to merge:
define common parameter point
for comparison, but so studies
in both frameworks, depending
on where people are comfortable

We need a reliable and powerful reconstruction software framework

LCIO based analysis is favored
(MARLIN for LDC based studies, LCIO and Satellites for GLD)

Concept and Architecture



MARLIN modules: availability

First complete reconstruction version exists:

full tracking: full solid angle, all sub-detectors, individual and combined

vertexing: sophisticated secondary vertex reconstruction code

jet finding, cluster finding, photon finding, etc

three particle flow implementations:

- WOLF
- trackwise PFA
- PandoraPFA (currently by far the best)

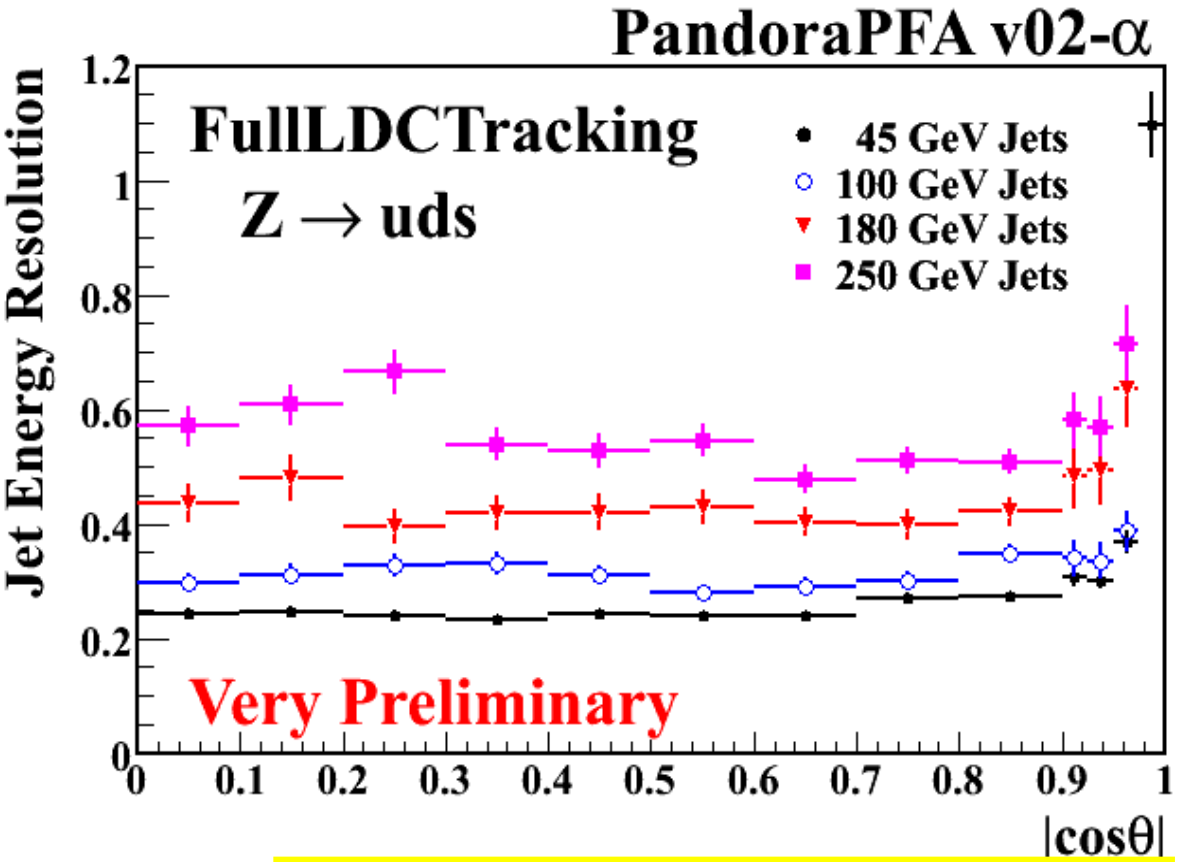
Particle Flow: Performance

Particle flow (PandoraPFA)
including full realistic tracking

Mark Thomson, Cambridge

There is still room
for significant improvement

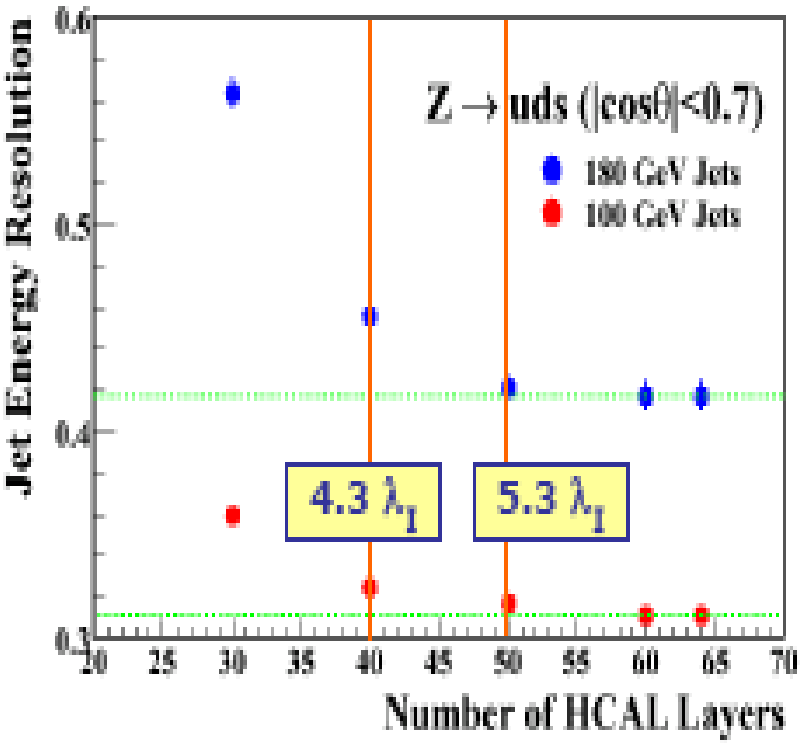
but performance is
good enough to
start real physics analyses

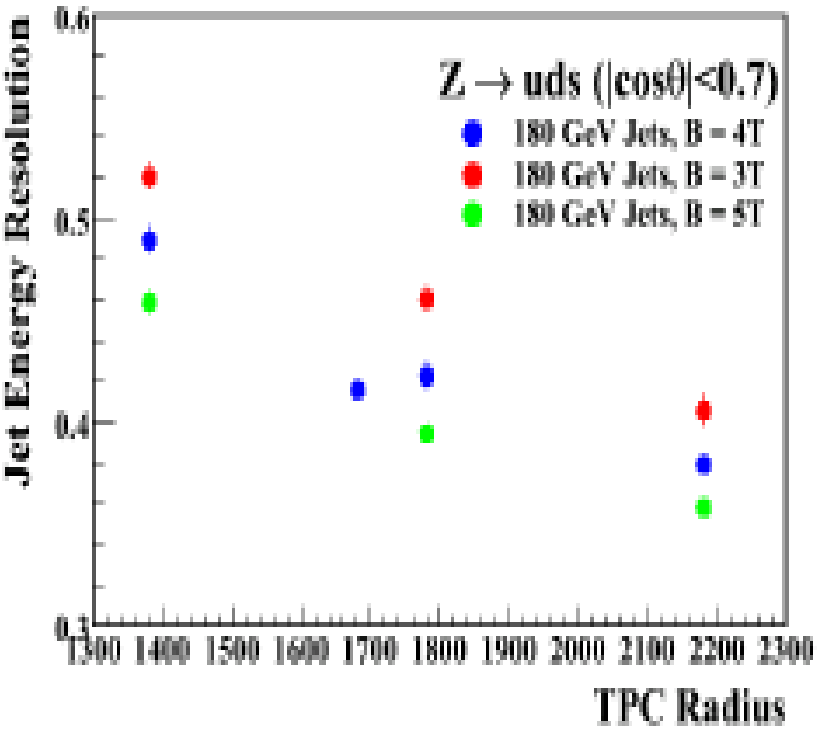


25%/sqrt(E) at 45 GeV at the moment including full LDC tracking!

Optimization studies

Technically driven optimization studies: e.g. Performance of particle flow





Interested groups

Channel/Area	Topic	Groups
$e^+e^- \rightarrow Zh$	Recoil mass l^+l^-X	DESY-Zeuthen/MPI, LAL
	Branching Ratio	Edinburgh, Bristol,
	Direct mass	DESY-Zeuthen/MPI
	Heavy Higgs	DESY
$e^+e^- \rightarrow Zhh$		RHUL
e+e-→selectrons		MPI
e+e-→smuons		MPI, DESY
e+e-→stau stau		DESY, RHUL, LPNHE-LAL
e+e-→WWvv/ZZvv		Cambridge, DESY
e+e-→tt	6 jet final states	RAL
	ttZ tbW vertices	Krakow
de/dx	meta-stable staus	DESY(Schafer)
Single gammas	rad. χ^o	Edinburgh(Martin)
Vertex Charge	c cbar/ b bbar	Oxford(Hillert,Jeffery)
tau polarization		RHUL
Kinks	GMSB	Santa Cruz

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e+e-→selectrons		MPI
e+e-→smuons		MPI, DESY
e+e-→stau stau		DESY, RHUL, LPNHE-LAL
e+e-→WWvv/ZZvv		Cambridge, DESY
e+e-→tt	6 jet final states	RAL
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Summary

The detectors have started to work towards the LOI

LDC has re-organised together with GLD to form ILD

A very active group has started to work out an optimization and physics demonstration program

To finish an LOI by October 1 is a challenge, but we think we can do it.

ILD: http://www.ilcild.org