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 LDC/ GLD like 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

Need to converge on one detector from the two LDC and GLD baselines

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 LDC and GLD

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.

The ILD organization

Highest priority: Detector definition and optimization:

Optimization working group

This group (see Tuesday session) is charged to perform the detector optimization through selected physics programs.

This is the most important group for ILD for the coming months.
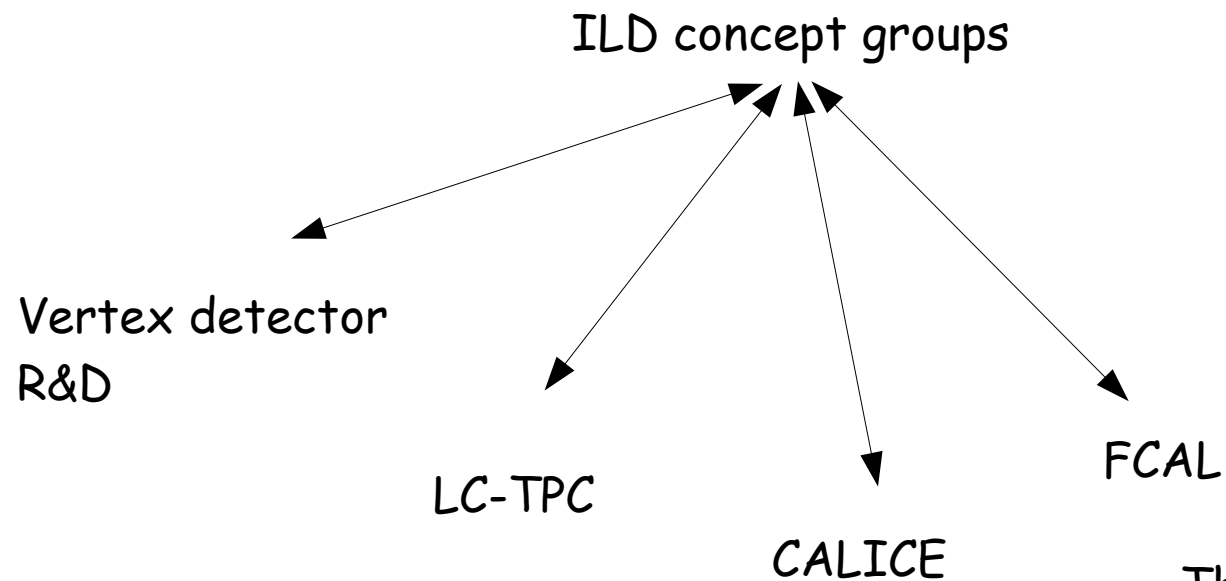
Everyone is invited to join the work of this group

MDI group:

Provides the contact point to the machine, is the nucleus for an engineering effort which we have to get going for the EDR

The ILD Organization

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

ILD concept groups

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

Vertex detector R&D

LC-TPC

CALICE

FCAL

others?

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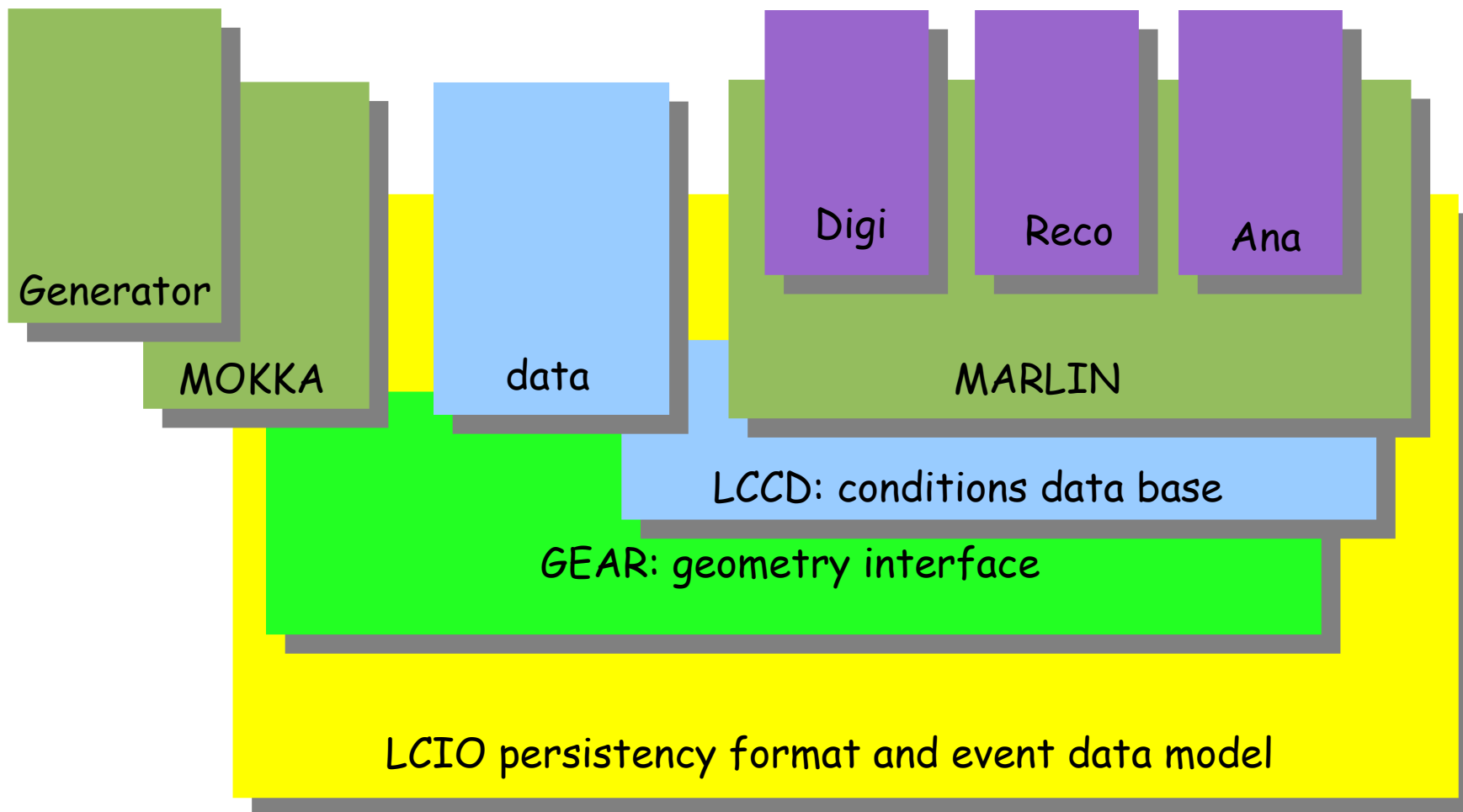
ILD Optimization

Goal: do an "real" optimization based on full simulation and reconstruction

Tools are nearly in place (see simulation session, talks by Akiya, Tamaki, Ties)
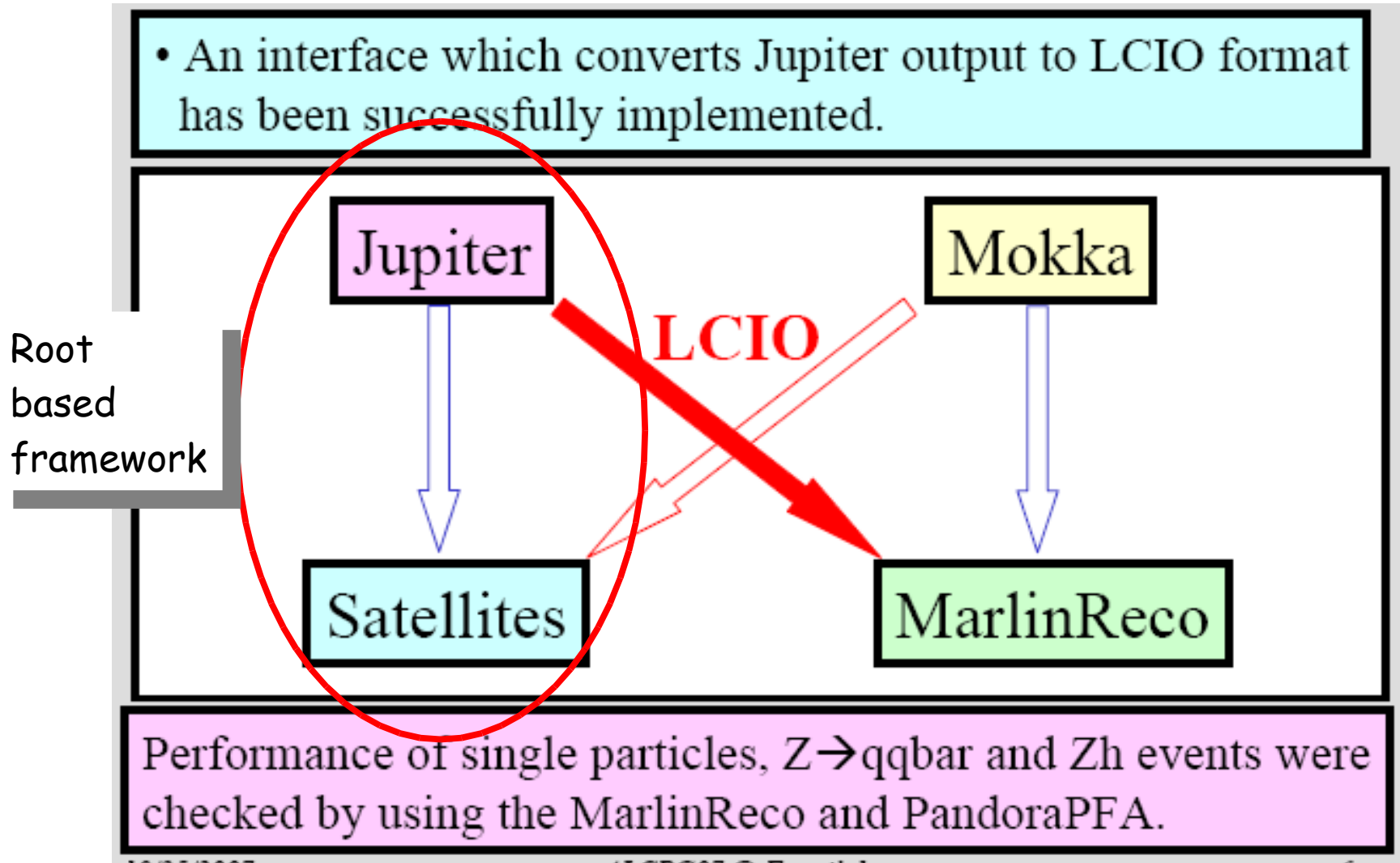
Plan for central production of large SM samples to be used in analyses,

plus selected signal samples

Problem: we do not have a common software framework at the moment
.. and we do not have the time to converge on one.

The LDC Software Chain

Generator

MOKKA

data

Digi

Reco

Ana

MARLIN

LCCD: conditions data base

GEAR: geometry interface

LCIO persistency format and event data model

Integration GLD - LDC

- An interface which converts Jupiter output to LCIO format has been successfully implemented.

Root based framework

Jupiter

Mokka

LCIO

Satellites

MarlinReco

Performance of single particles, Z→qqbar and Zh events were checked by using the MarlinReco and PandoraPFA.
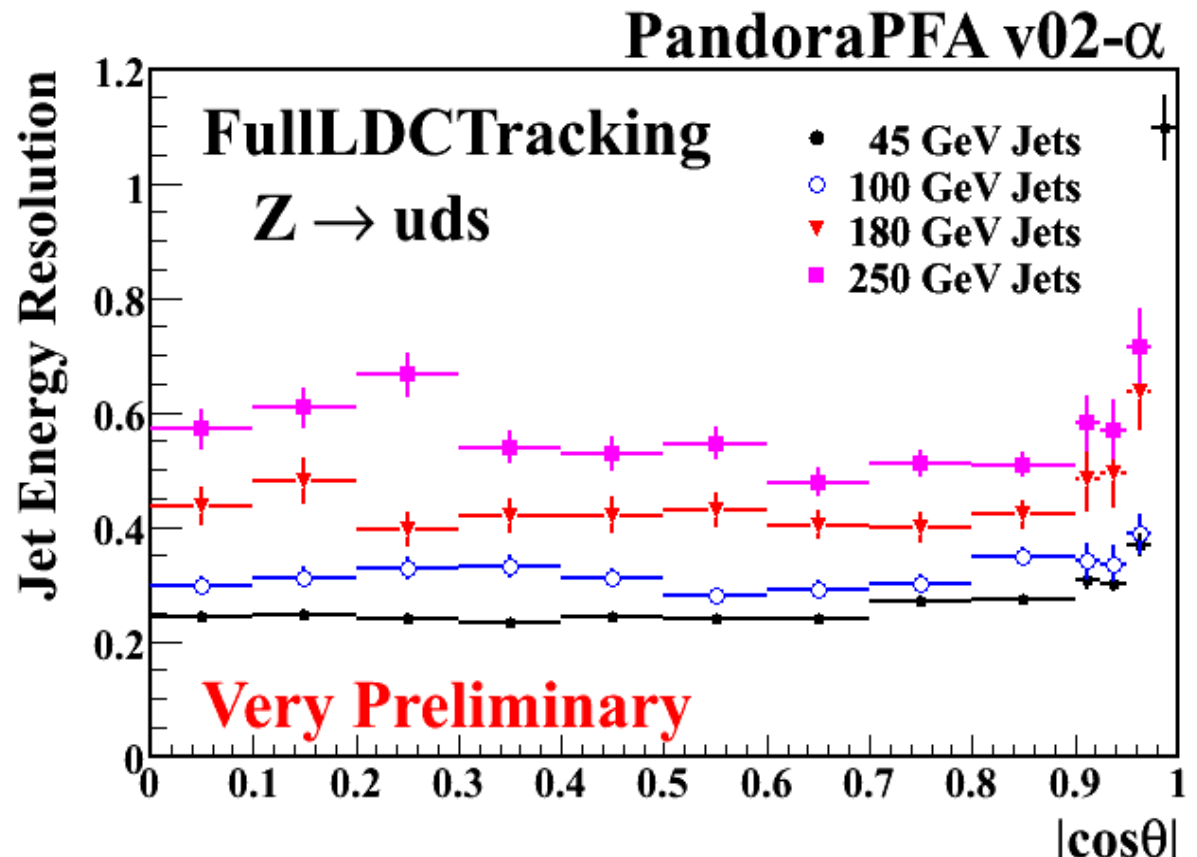
Particle Flow: Performance

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

PandoraPFA v02-α

FullLDCTracking

$Z \rightarrow$ uds

- • 45 GeV Jets
- ○ 100 GeV Jets
- ▼ 180 GeV Jets
- ■ 250 GeV Jets

Very Preliminary

Jet Energy Resolution

|cosθ|

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

Performance in Jupiter

Running PandoraPFA
in the Jupiter framework

Very important milestone,
which will give us confidence
that we can do ILD based
on both softwares!
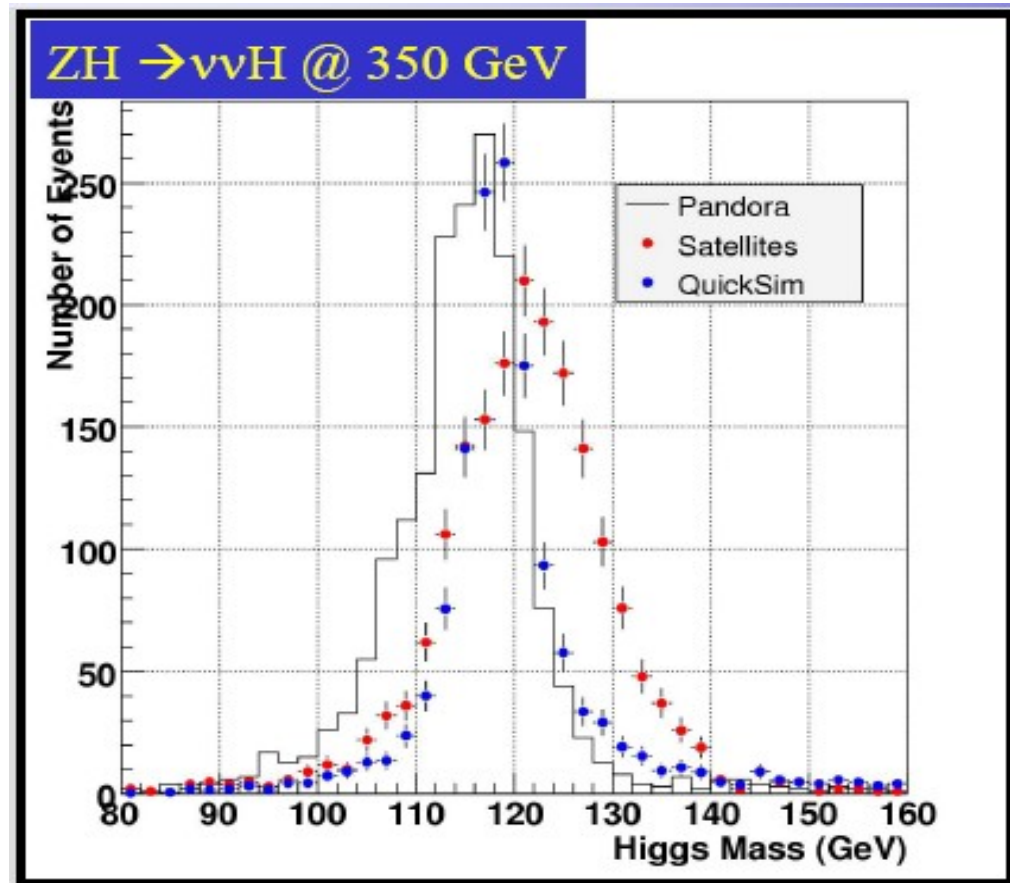
Proposed SM sample

Preliminary!

* ee->4f: 50fb-1
* ee->2f: 20fb-1
* ee->6f: 20fb-1
* calibration samples:
    o 20.00 light quark 2f at 91.2 GeV
    o tt (6f) at 350 GeV
* gg->X: 1fb-1
* ee->gg(n*g): 10fb-1
* nunu(n*g): 20fb-1
* ee->ee: 0.1fb-1
* eg->eg: 0.1fb-1
* ee->hX: 50fb-1
* rest: 1fb-1

Background sample
which should be ok
to study many
reactions at the ILC
for 500 fb^-1

Important point to recognise:
A "complete" background sample
is very important and hard to get:

need for central production

Authors: Philip Bechtle, Jenny List

Benchmarks

Proposed list of benchmark reaction:

Ecm to be discussed

1) e+e- -> Zh -> llX, mh = 120 GeV, Ecm = 350GeV
   --> Test of tracker momentum resolution

2) e+e- -> Zh; h -> cc, tau tau, WW*, mh = 120 GeV, Ecm = 350GeV
   --> Test of heavy flavor tagging (vertex performance)

3) e+e- -> selectron pair at Point 1, Ecm = 500GeV
   --> Test of tracker momentum resolution

4) e+e- -> chargino pair/neutralino pair at Point 5, Ecm = 500GeV
   --> Test of Particle Flow (WW/ZZ separation)

How to move forward

1) Regular phone/ Video meetings (about once every 2 weeks) on the optimization

first meeting October 31 (see announcements)
e-mail list ild-detector-optimisation@desy.de (you can subscribe yourself)

2) Regular phone meeting for MDI issues (see talk by Tauchi)

3) Series of ILD workshops is planned

first in Europe: early January, place to be confirmed

4) WEB page;

http://www.ilcild.org (preliminary version in place, watch for fully functional page in a few weeks (plone based)

Summary

The LOI should be heavy on analyses, light on the rest

Here is an excellent opportunity for new groups (even small ones) to become involved and make a contribution: it is now possible

I think we are well positioned to have good results for "ILD"

however a lot of work remains to be done:

we need to define ILD soon

we need to generate a large number of events and teach people how to use them

We need to understand better how we intend to interact with the R&D collaborations