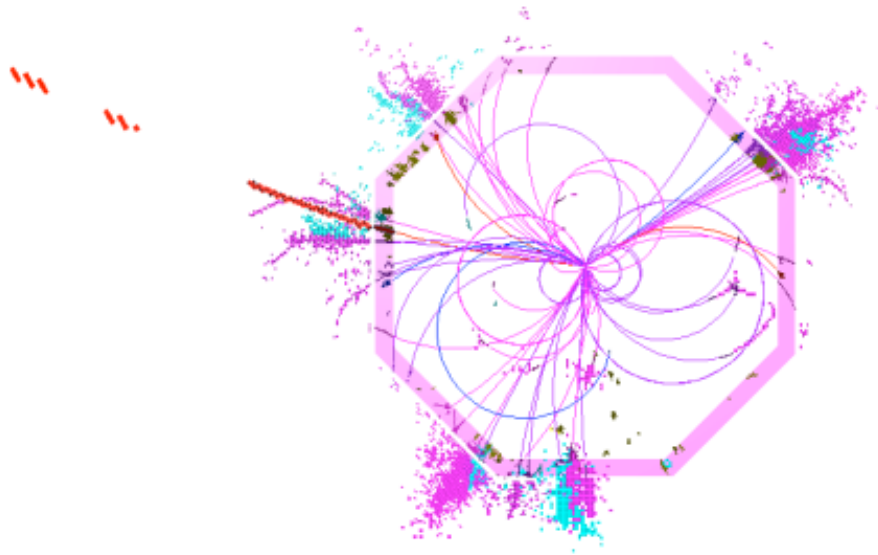


ILD optimization: discussion



Optimization @ Krakow

Very interesting and lively presentation and discussions during this session.

Important: Get an impression what's going on, who does what.

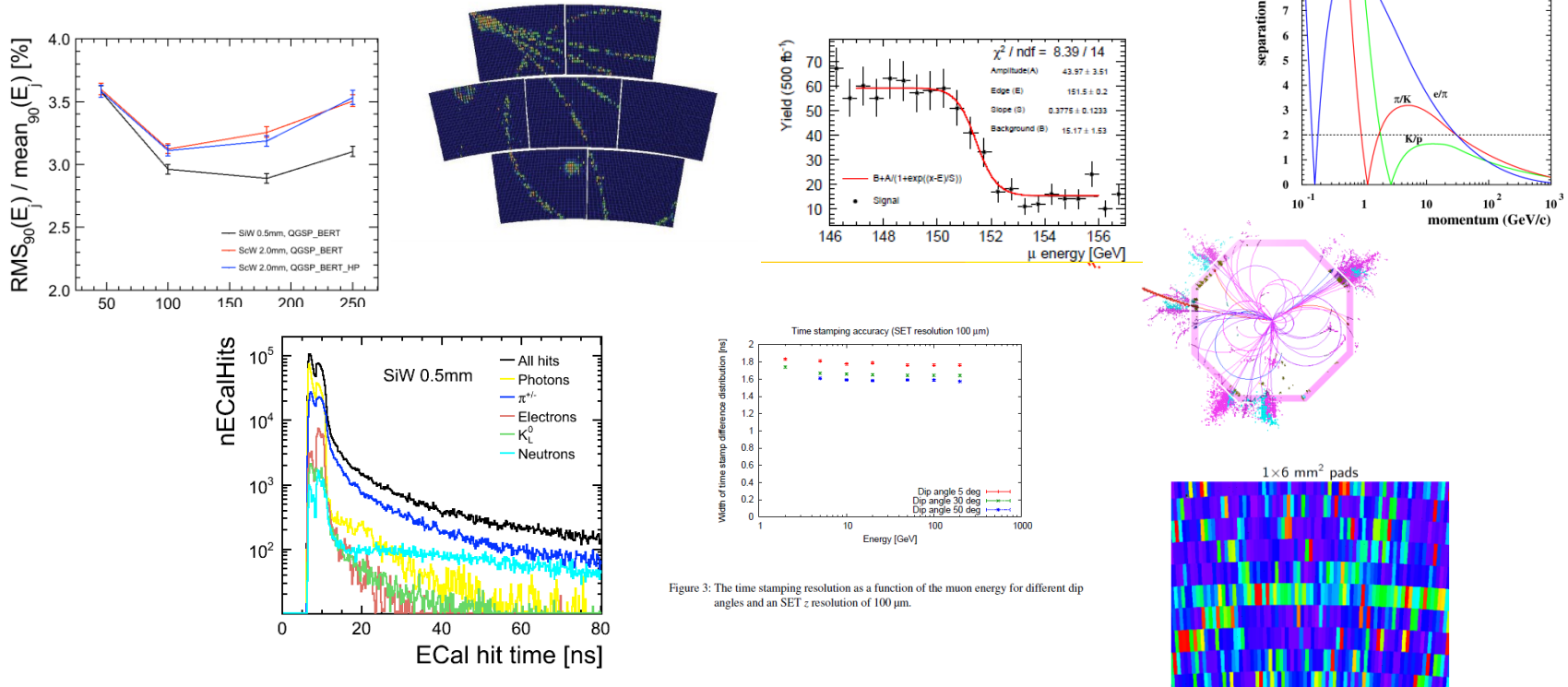


Figure 3: The time stamping resolution as a function of the muon energy for different dip angles and an SET 2 resolution of 100 μ m.

Work done previously

A lot of work was done (on many systems) already:

- A lot of information is out there, but is not properly brought together nor properly documented.
- What can we do about this? At least we should collect the information in one place and make it digestible.

Some Trends

Mark will comment in more detail

Tracking and Vertexing performance is robust

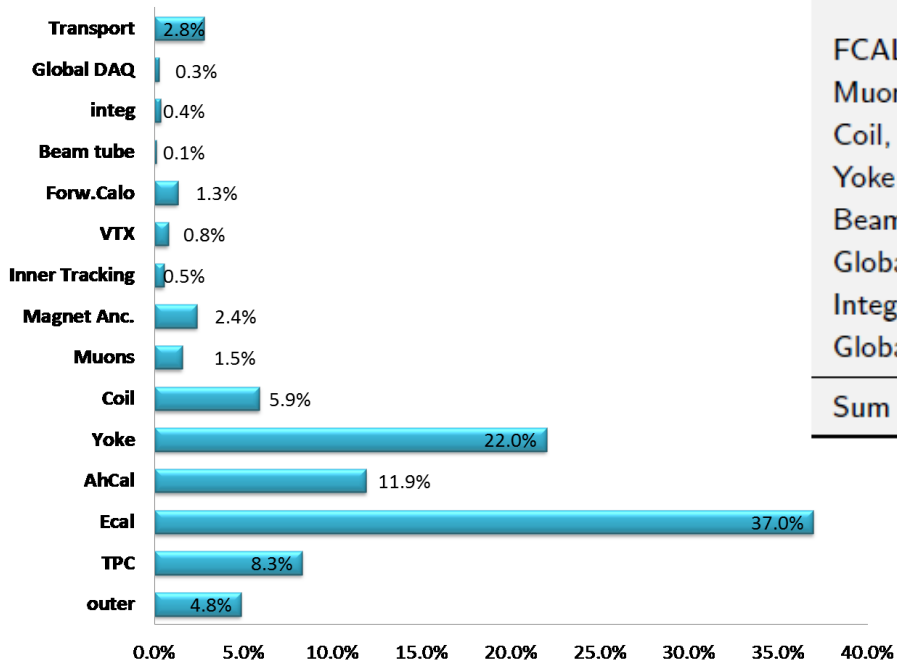
- Detailed designs need to be optimized
- Role of silicon needs to be clarified

Calorimetry

- Performance more robust against small changes than we did think
- At least for 500 GeV the current system is slightly oversized
 - Granularity (both transverse and longitudinal)
 - Thickness
- Intense studies are ongoing

A “Central” issue: Costs

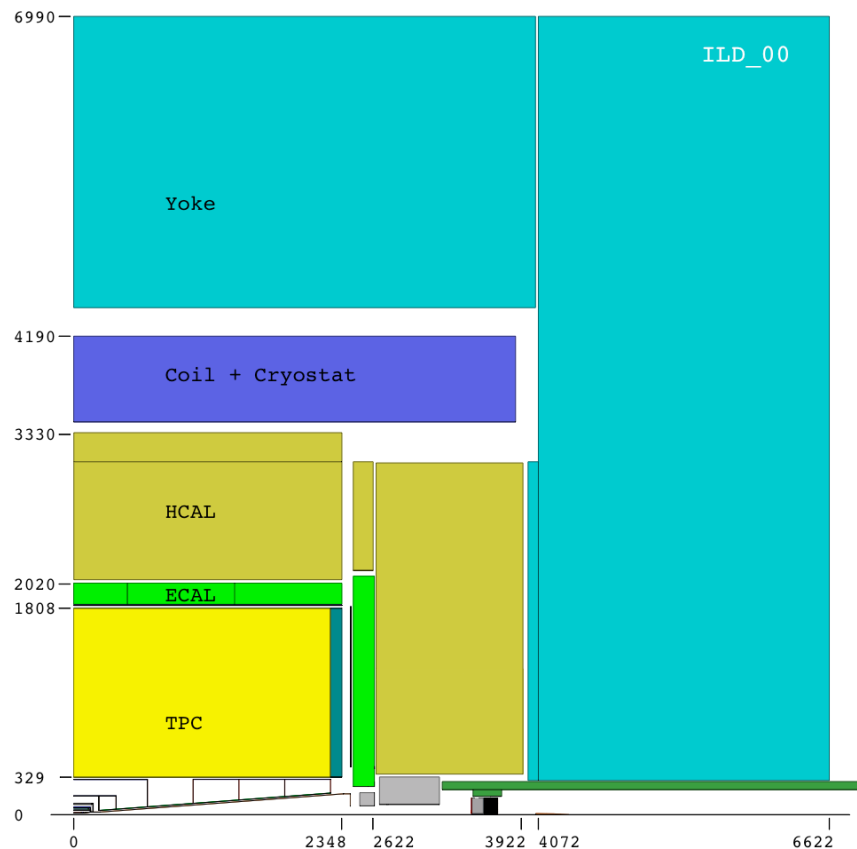
Costing exercise as part of DBD
Needs significant more work
and checking, but main
messages are clear.



System	Option	Cost [MILCU]	Mean Cost [MILCU]
Vertex			3.4
Silicon tracking	inner	2.3	2.3
Silicon tracking	outer	21.0	21.0
TPC		35.9	35.9
ECAL			116.9
	SiECAL	157.7	
	ScECAL	74.0	
HCAL			44.9
	AHCAL	44.9	
	SDHCAL	44.8	
FCAL		8.1	8.1
Muon		6.5	6.5
Coil, incl ancillaries		38.0	38.0
Yoke		95.0	95.0
Beamtube		0.5	0.5
Global DAQ		1.1	1.1
Integration		1.5	1.5
Global Transportation		12.0	12.0
Sum ILD			391.8

Huge effort by LLR group
for the DBD

Overall Detector size



Clear opinion:

We need to make ILD smaller to contain the costs.

- Radius
- Length

This will be a major direction of future studies

BUT:

Be careful: 1TeV? Making ILD smaller cannot be changed later on.

Staging: is this an alternative?

Vertex Detector

Show the relative performance of 3x2 vs 5 layer geometry

- Use of mini vectors
- Behaviour against background
- Performance as part of the pattern recognition

Physics driven studies:

- Look (again) at dependence of flavour tag and jet charge on VTX performance

The vertex detector system is not (really) a cost driver: costing plays only a minor role

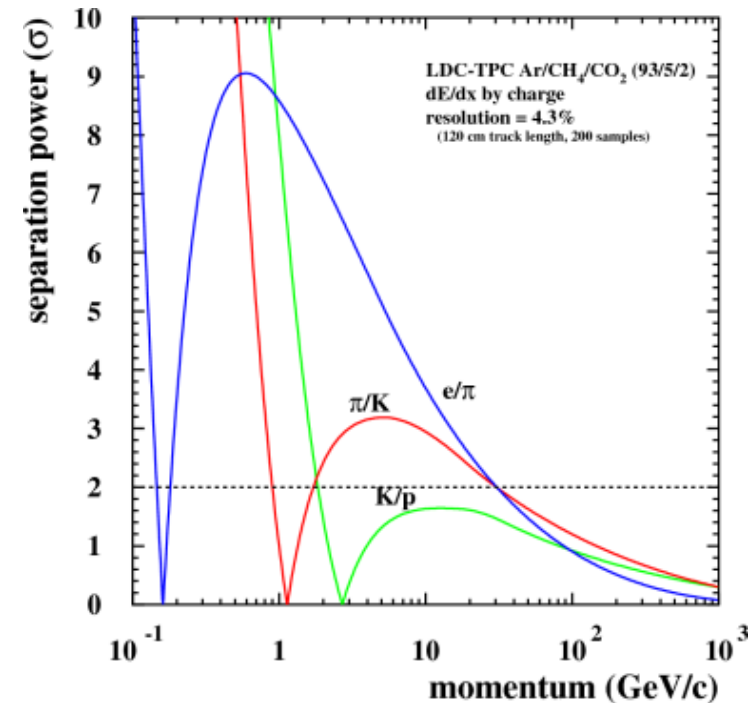
Tracker

TPC: no significant optimization

- Understand performance
- Understand scaling of performance

Overall tracking concept:

- Look again at the relative weight of TPC and Silicon
- Role of outer Silicon?
- Importance of dE/dx in the overall tracker?
 - TPC
 - Silicon?



Forward Direction

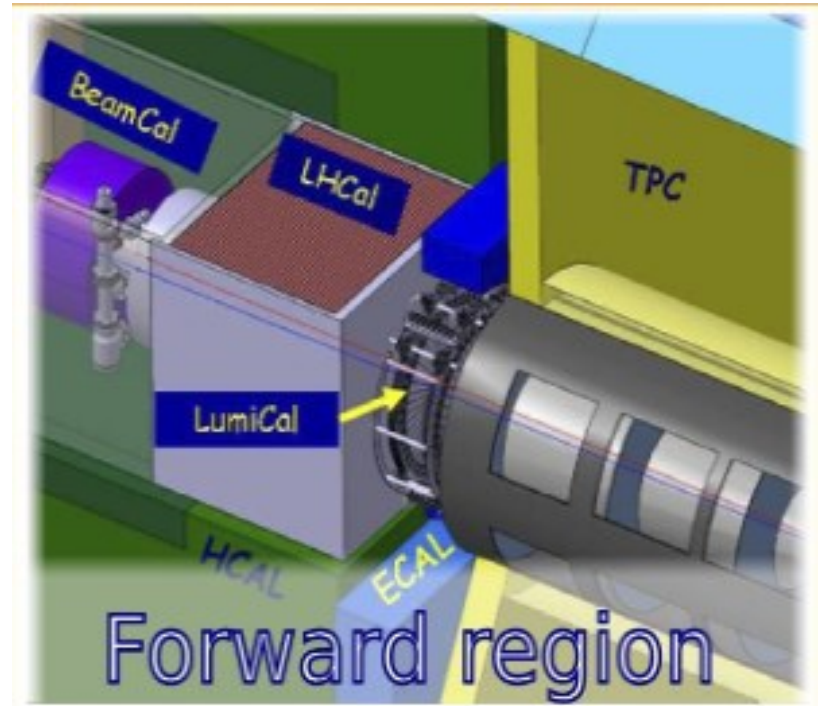
Current System:

Performance well studied,

Except:

LHCAL

- No information available
- Role in reconstruction no clear
- No technological design



Organisation

Many studies are ongoing

We should establish a central forum within ILD to discuss results from optimization

- Make sure that things are transparent
- Understand what has been done
- Make sure there is no overlap

Need to identify a “leader” of the optimization

Need to identify the proper format (meeting? Others?)

This can only work if
the technical groups
participate here

My proposal: use the Wednesday slot

- Ever other week have a dedicated optimization meeting
- In between have physics / software meetings

