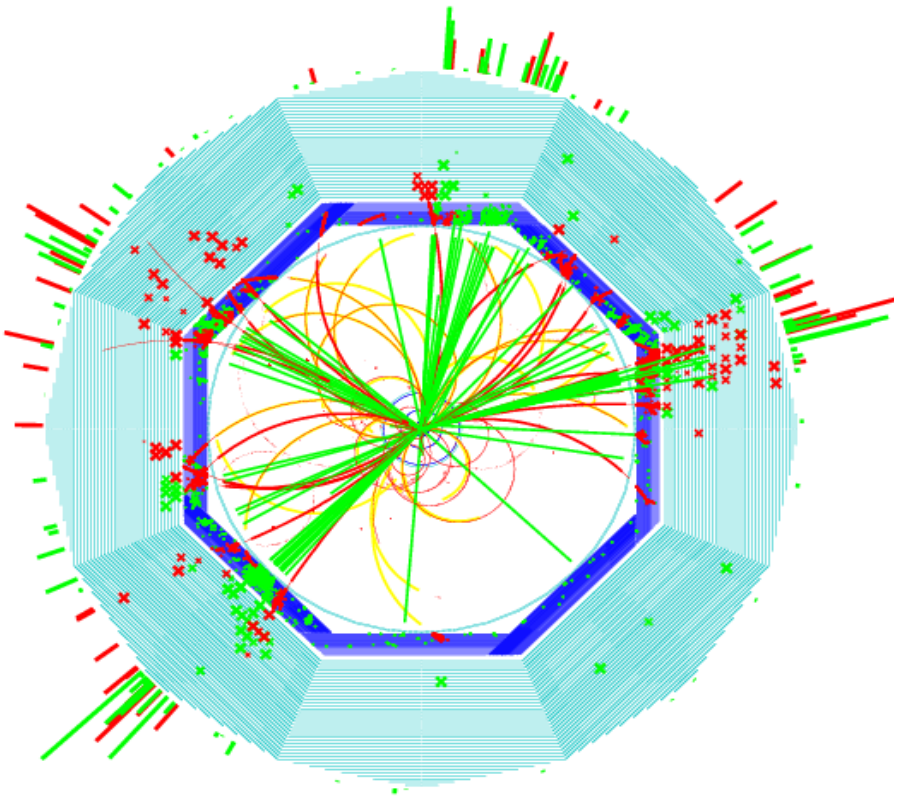
The Large Detector Concept

Definition of the **L**arge **D**etector **C**oncept

- 3D continuous tracking
- Precise vertex detector
- Detector optimized for particle
- Extremely hermetic detector

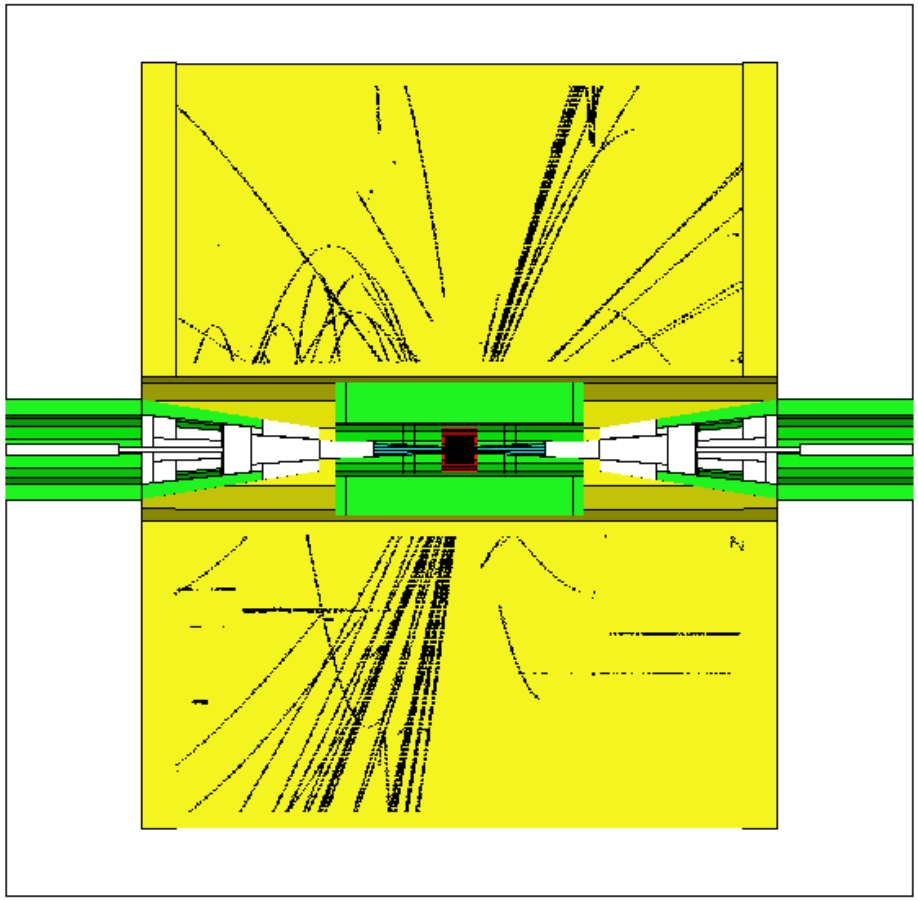


Starting point:

TESLA TDR detector

US LD detector

Why 3D Continuous Tracking?



- Stable, efficient, robust tracking
- Demonstrated by full simulation including 10-times ILC backgrounds
- High efficiency for "imperfect" tracks: kinks, backscatter, K0s, Lambda, ...
- Some particle ID capability "for free"

A TPC tracker backed up by an SI tracker seems ideal for a particle flow detector (highly efficienct, low fake rate, robust)

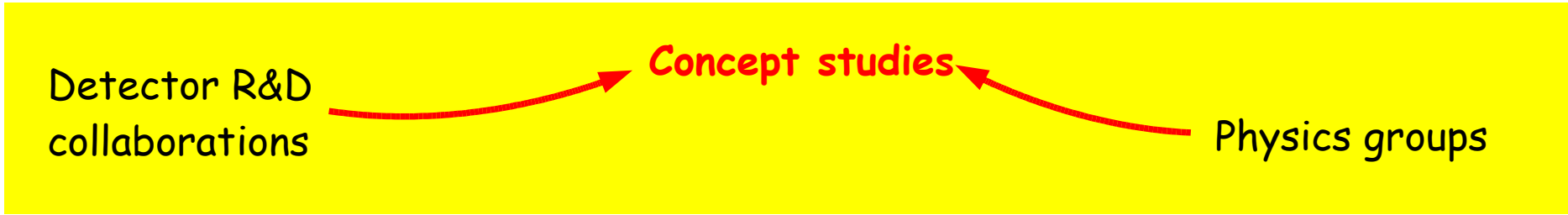
Why Particle Flow

Particle flow generally accepted
as essential for LC detector

Why precision VTX

Really no discussion on this – universally accepted!

The LDC concept



Stress: integration of subsystems
interplay of algorithms and detector layout

Contact people:

Marco Battaglia, Ties Behnke, Dean Karlen, Henri Videau, Yasuhiro Sugimoto,
+ 1 further asian collegue

Vertexing challenge

Tracking challenge

Forward challenge

Particle flow challenge

Subsystem technologies:
interface to R&D collaborations

LDC design issues

Incomplete list: we need your input to make this list complete

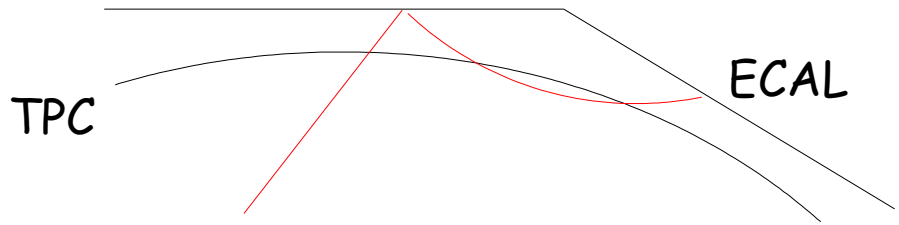
- Optimization/ realization of the forward components

  TPC endplate/ FCH/ forward Silicon/ Beam intrumentation

- ECAL- HCAL interplay, ECAL – HCAL optimization

- Understanding transitions from one sub-detector to the next

Example: backslash from calorimeter



LDC design issues II

- Overall size optimization
- Calibration issues:
  - Develop calibration strategies for each system
  - Study dependence on non-ideal detector's
  - Study issues of robustness
  - Study sensitivity to backgrounds, non-ideal machine conditions, ...
- Study and develop the machine detector interface, give feedback to the machine people

The next Steps

- For SNOWMASS: ensure proper and significant participation by LDC
- To ease the study of LDC:
  - Agree on a small number of detector "variants" which will be simulated and provided for SNOWMASS studies
  - Update and complete the tools needed to study LDC in close cooperation with the ECFA/ ACFA/ ALCPG simulation groups

The goal: provide in time for SNOWMASS a sensible range of points in parameter space, which can be used as starting points for a further optimsation.

The Longer Term

Optimize the LDC concepts compared to the starting points

We need physics benchmarks and detector benchmarks for this
Ideally, they would be the same for all concepts!

Understand the costing systematics and do a cost – performance optimization

Give feedback into the detector R&D groups where they need to focus their work for need on LDC

Conclusion

LDC is forming to follow up the older TESLA and LD detector designs

The detector is totally open to ideas / changes/ updates/ improvements

Unconventional ideas are very welcome!

Please sign up if you are interested in this concept

Temporary place to sign up to the mailing list:
http://www-flc.desy.de/ilc/ldc