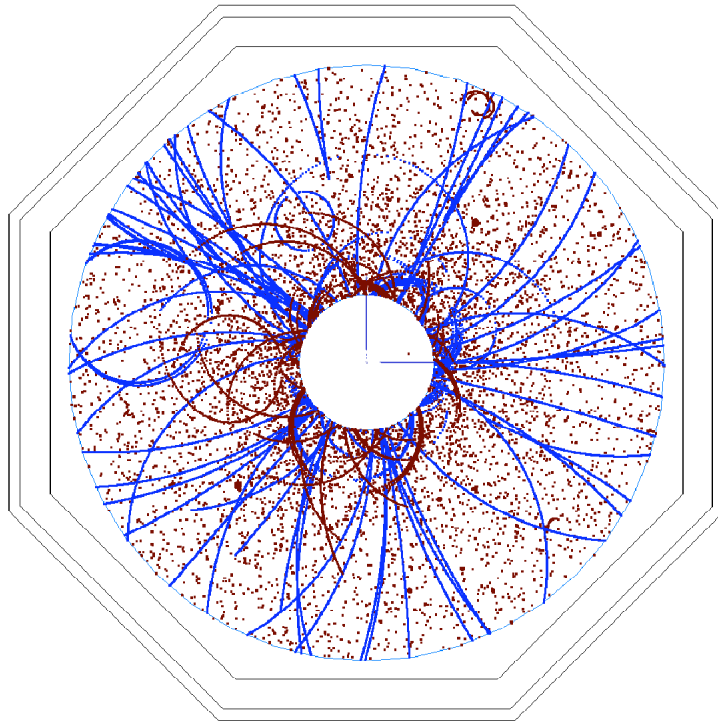


ILD Optimisation: towards 2012

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This talk:

- ① Overview
- ② Simulation
- ③ Optimisation
- ④ Backgrounds
- ⑤ Simulation

Aim of this mini-talk : seed discussion

Overview

- ★ Need to identify main goals of ILD optimisation for short/medium term ?
- ★ Formulate a **realistic** plan
- ★ Keep in mind aims of DBD for end 2012
- ★ Also an opportunity to improve tools/understanding
- ★ Should be remembered that we are building on the impressive Lol

Main Areas/Questions:

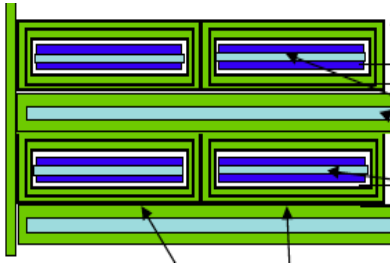
- Level of detail in simulation
- Sub-detector options in simulation
- Sub-detector optimisation
- Track reconstruction
- Background studies
- Physics studies at 1 TeV + ?
- Physics studies for SB2009

Large overlap with software group

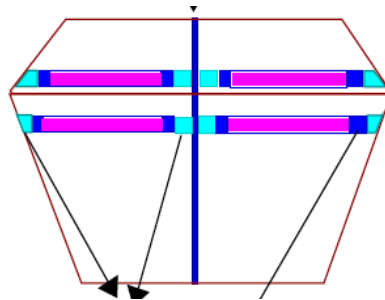
Simulation

- Many sub-detectors already in pretty good shape

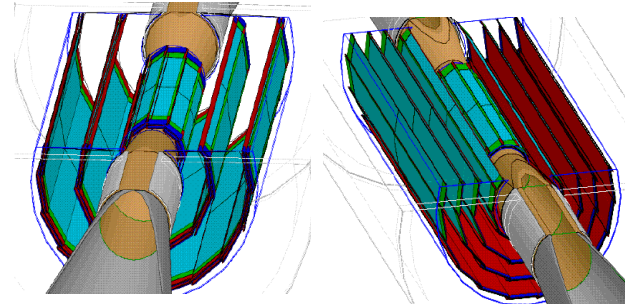
ECAL



HCAL



VTX



- Others require more work
- At Paris meeting we agreed to have detailed sub-detector drivers in Mokka by Summer 2010
- Essential for development of reconstruction software
- Must keep to this deadline

★ Services

- **“task force” : first estimate of services material (Catherine’s talk)**
- Timescales (?):
 - ◆ Needed for ongoing reconstruction development
 - ◆ First implementation in Mokka ~ Summer 2010

Options

- ★ **Need to be in position to evaluate options**
 - **Essential to include in Mokka as soon as possible**
 - Should have comparable level of detail in options and current baseline detectors – fair comparison of performance
 - Also need to consider increased/decreased services
 - Timescales (?):
 - ◆ First implementation in Mokka ~ Summer 2010
 - ◆ Need to include any significant changes to services
 - ◆ Timescale is important since it drives timescale for development of reconstruction
 - Major impact on Particle Flow Development
 - ◆ Main options for calorimeters
 - ◆ To compare, will need to develop “bespoke” PFA
 - ◆ Non-trivial effort...

Optimisation/Performance

Three main aspects: **ALL ESSENTIAL**

- ★ Compare performance of “options”, e.g.
 - SiW vs ScintW ECAL: PFA, tau ID, ...
 - AHCAL vs DHCAL: jet energy resolution
 - 5 single layer vs 3 double layer VTX: flavour tag/vertex charge
- ★ Requires:
 - Detailed Mokka drivers for all options
 - Dedicated reconstruction software, e.g. mini-vectors for double layer VTX, PFA for MAPs ECAL, ...
- ★ Not: full “SM mass production” for multiple detector models

- ★ Optimise sub-detectors, e.g.
 - Number of layers in ECAL
 - Understand impact of TPC endplate thickness
- ★ Address “shopping-list” of questions

- ★ Optimise ILD global design, e.g.
 - L*/HCAL endcap thickness/muon chambers as tail-catcher

Backgrounds

Significant holes in our understanding of impact of background in ILD

★ What kind of questions do we want to answer ?

- time-stamping strategy
- impact on forward tracking (patrec etc.)
- timing requirements of VTX
- robustness of Si tracking
 - > 2 layers in SIT ?
 - mini-vectors in double layer VTX
- timing requirements for ECAL/HCAL
- impact on forward HCAL reconstruction
- does two-photon background impact physics at the ILC
- beam halo muon background

- ★ Currently can't answer these questions or, at best, expert studies
- ★ Task force will develop more complete strategy for background

**Reconstruction software development is essential
But, do not underestimate, this is a major effort !**

Physics

- ★ At Paris decided to revisit plans for **next large MC** in Summer
 - Depends on progress with simulation/reconstruction:
 - Either
 - wait until we have a new baseline detector model
 - go ahead “now” with ILD00 at 1 TeV
- ★ A big question...
 - **What is the main aim of the next large MC production ?**
 - **Could** argue - demonstrate ILC Physics (I am not convinced)
 - Perhaps more important:
 - ◇ demonstrate ILD for ILC at 1 TeV
 - ◇ including backgrounds
 - ◇ probably want to wait for new ILC baseline
- ★ But that’s not all...
 - **SB2009 (Akiya’s talk)**
 - Dedicated studies at 350 GeV probably needed
 - In particular, if can’t run at 250 GeV due to low lumi., what is the impact on Higgs BR measurements ?
 - This is a non-trivial effort

Summary: **ILD SB2010 ?**

