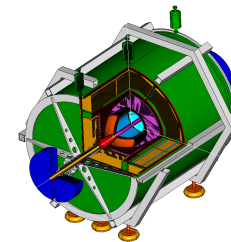


The 4th Concept Detector at ILC



VXD

Vertex Detector (VXD)

5 barrel layers (96 ladders)

4 endcaps (96 sectors)

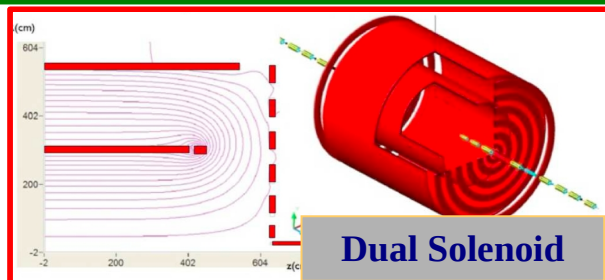
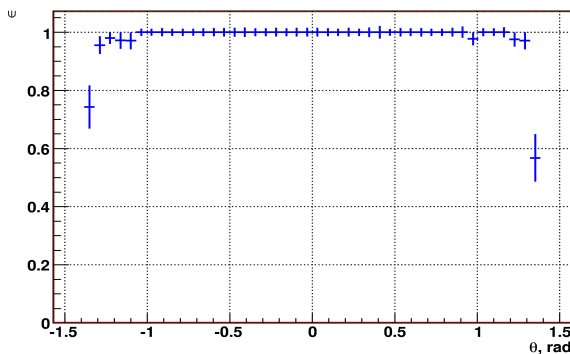
20 μm x 20 μm pixel size Total 4.3×10^9 pixels

Detector support: 100 μm CarbonFiber

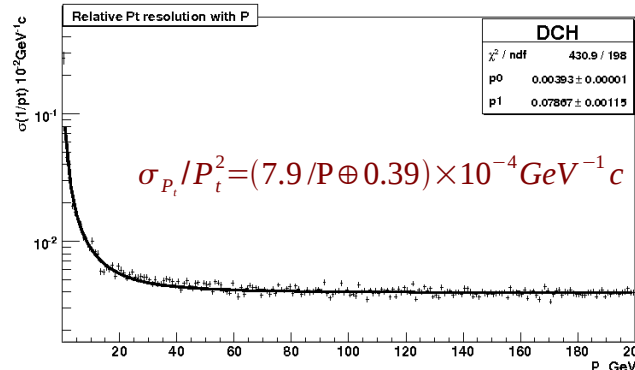
Basic barrel building block: rectangular ladder

Basic endcap building block: trapezoid sector

Efficiency for good tracks



Dual Solenoid



Drift Chamber (DCH)

All stereo, cluster timing drift chamber

150000 field wires (80 μm Al)

66000 sense wires (20 μm W)

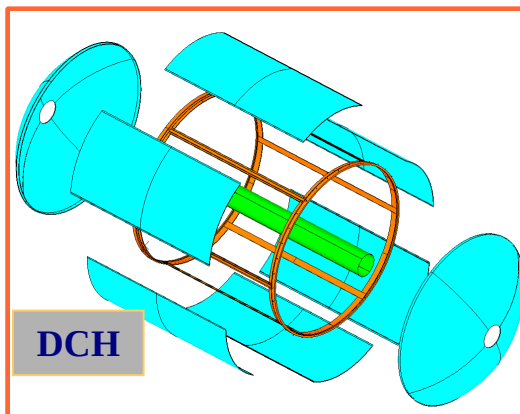
Light He based gas mixture (90% He – 10% iC_4H_{10})

Mechanical structure entirely C-fiber

Max drift time contained in one BX

Total tracking volume (inner wall, gas and wires) < 0.5% X_0

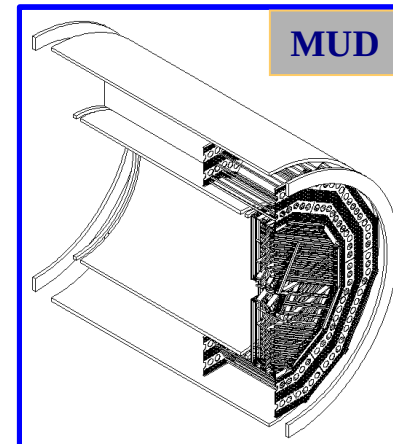
Basic building block: exagonal cell



DCH

See G. Tassielli's poster

MUD



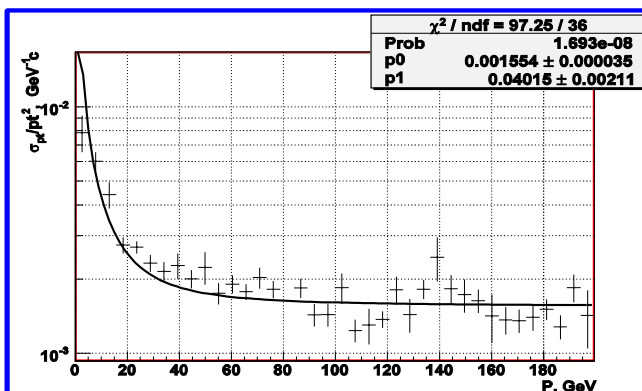
Muon Spectrometer (MUD)

Barrel: 31500 tubes 21000 channels

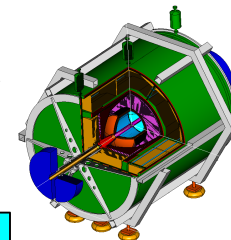
Endcaps: 8640 tubes 9762 channels

Total: 40140 tubes 30792 channels

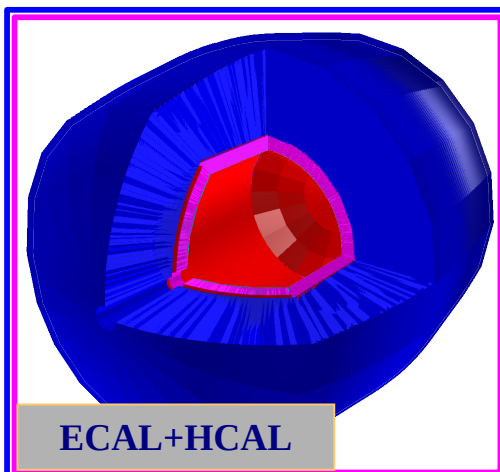
Basic building block: 4.6 cm drift Al tube filled with gas mixture 90% He – 10% iC_4H_{10}



The 4th Concept Detector at ILC



Physics Studies



ECAL+HCAL

Dual Readout Electromagnetic Calorimeter (ECAL)

Barrel: 262144 BGO crystals

Endcaps: 119200 BGO crystals

4X4 crystals for each HCAL tower

~ 22.7 X_0 depth and ~ 1 λ_{int}

Azimuth coverage down to ~ 2.8°

Fully projective geometry

Basic building block: 25 cm BGO crystal

Triple Readout Hadronic Calorimeter (HCAL)

Cu + scintillating fibers + Čerenkov fibers

Barrel: 16384 towers

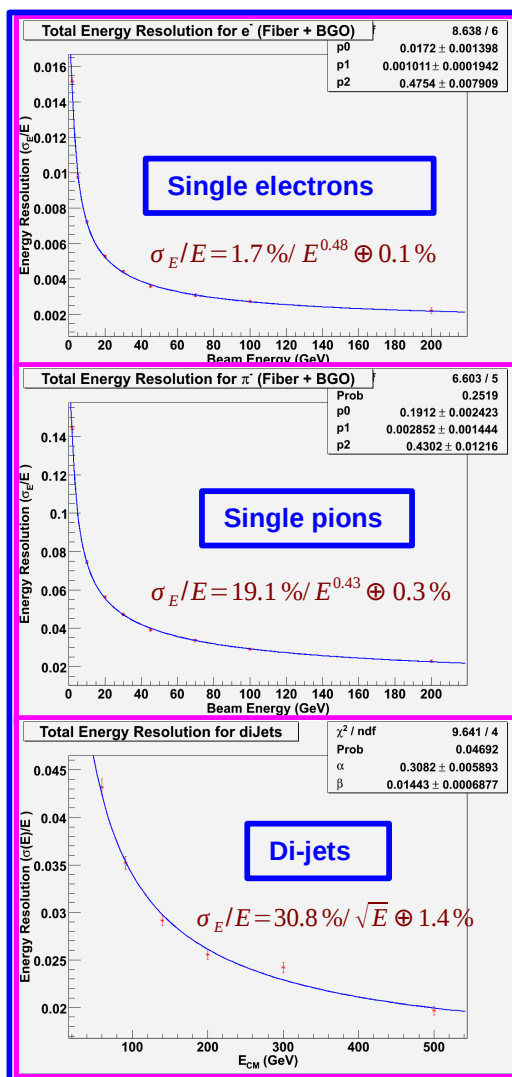
Endcaps: 7450 towers

~ 7.3 λ_{int} depth

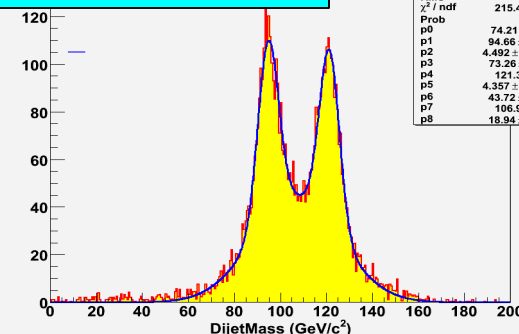
Azimuth coverage down to ~ 2.8°

Fully projective geometry

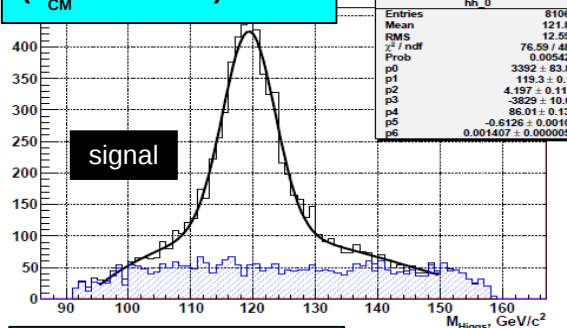
Basic building block: 150 cm tower



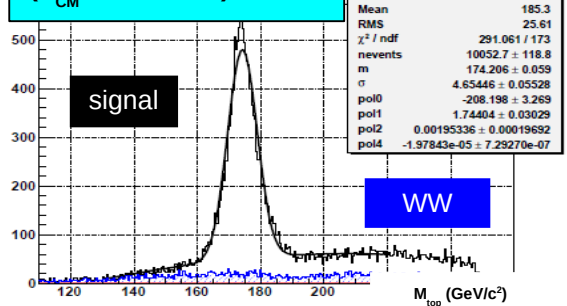
$e^+e^- \rightarrow HZ \rightarrow qq w$
($E_{CM} = 250 \text{ GeV}$)



$e^+e^- \rightarrow HZ \rightarrow qq qq$
($E_{CM} = 250 \text{ GeV}$)

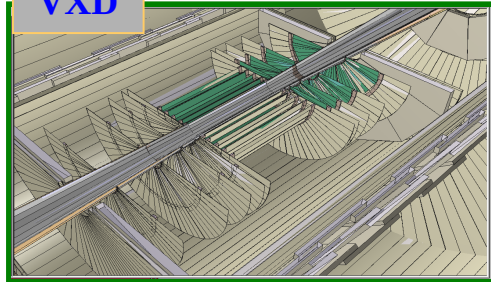


$e^+e^- \rightarrow t t \rightarrow bqq bqq$
($E_{CM} = 500 \text{ GeV}$)



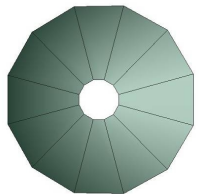
The 4th Concept Detector

VXD



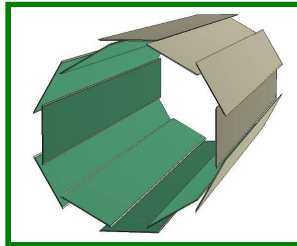
Vertex Detector (VXD)

- 5 barrel layers (96 ladders)
- 4 endcaps (96 sectors)
- 20 $\mu\text{m} \times 20 \mu\text{m}$ pixel size
- Total 4.3×10^9 pixels
- Detector support: 100 μm CarbonFiber



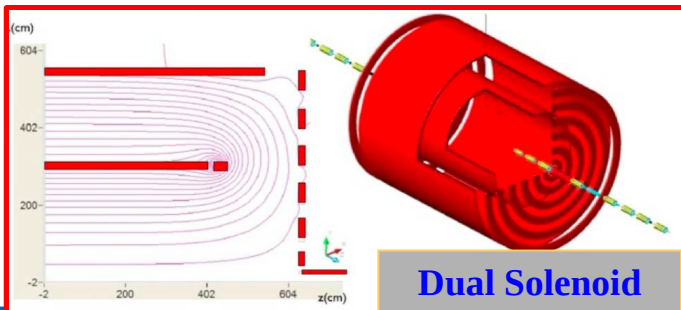
Layout of one layer of the VXD barrel

Basic building block: rectangular ladder

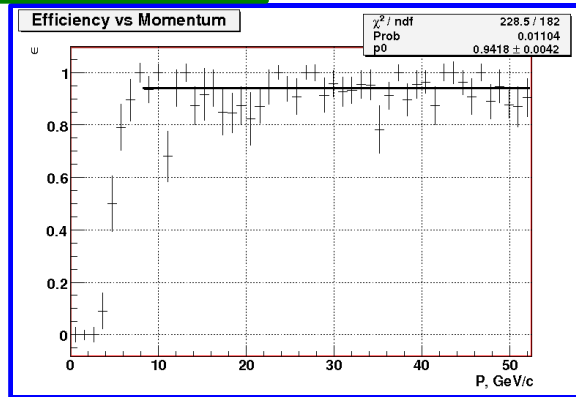
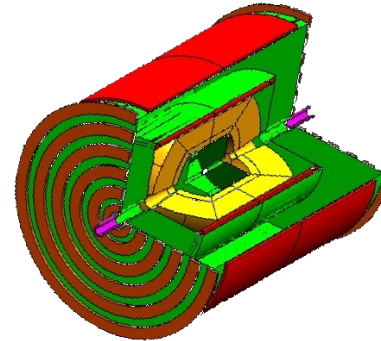
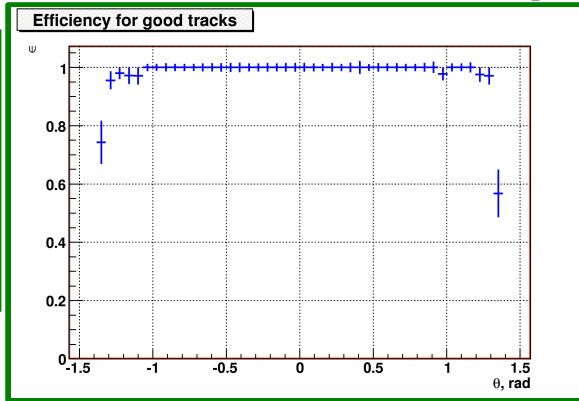


Layout of one layer of the VXD endcaps

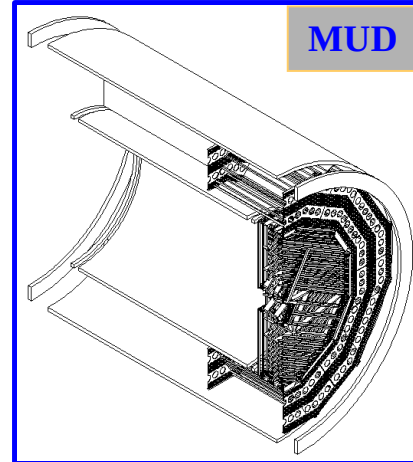
Basic building block: trapezoid sector



Dual Solenoid



MUD



Muon Spectrometer Detector (MUD)

Barrel:

31500 tubes 21000 channels

End caps:

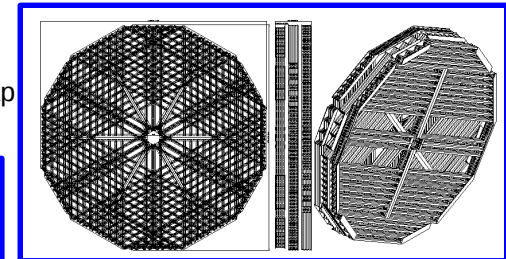
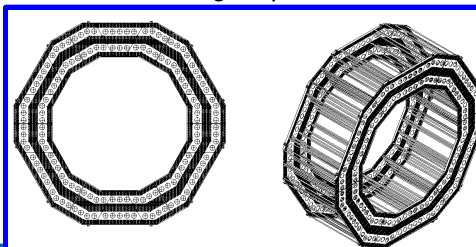
8640 tubes 9792 channels

Total:

40140 tubes 30792 channels

Basic building block: 4.6 cm drift Al tube filled with gas mixture 90% He – 10% iC_4H_{10}

Layout of one planar sector of Muon endcap
each containing 20 planes of tubes



Layout of one stave of Muon barrel
each containing 20 layers of tubes