The 4th Concept Detector at ILC

Vertex Detector (VXD)
- 5 barrel layers (96 ladders)
- 4 endcaps (96 sectors)
- 20 μm x 20 μm pixel size Total 4.3x10⁹ pixels
- Detector support: 100 μm CarbonFiber

Basic barrel building block: rectangular ladder
Basic endcap building block: trapezoid sector

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% iC₄H₁₀)
- Mechanical structure entirely C-fiber
- Max drift time contained in one BX
- Total tracking volume (inner wall, gas and wires) < 0.5% X₀

Basic building block: exagonal cell

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% iC₄H₁₀

See G. Tassielli's poster
The 4th Concept Detector at ILC

**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 $\lambda_{int}$
- Azimuth coverage down to ~ 2.8°
- Fully projective geometry
- Basic building block: 25 cm BGO crystal

**Triple Readout Hadronic Calorimeter (HCAL)**
- Cu + scintillating fibers + Čerencov fibers
- Barrel: 16384 towers
- Endcaps: 7450 towers
- ~ 7.3 $\lambda_{int}$ depth
- Azimuth coverage down to ~ 2.8°
- Fully projective geometry
- Basic building block: 150 cm tower

**Physics Studies**
- $e^+e^- \rightarrow HZ \rightarrow qq$ w (E$_{CM}$ = 250 GeV)
- $e^+e^- \rightarrow tt \rightarrow bqq bqq$ (E$_{CM}$ = 500 GeV)
The 4th Concept Detector

**Vertex Detector (VXD)**
- 5 barrel layers (96 ladders)
- 4 endcaps (96 sectors)
- 20 µm x 20 µm pixel size
- Total 4.3x10^9 pixels
- Detector support: 100 µm CarbonFiber

**Muon Spetrometer Detector (MUD)**
- **Barrel:**
  - 31500 tubes
  - 21000 channels
- **End caps:**
  - 8640 tubes
  - 9792 channels
- **Total:**
  - 40140 tubes
  - 30792 channels

Basic building block:
- **VXD**
  - 4.6 cm drift Al tube filled with gas mixture 90% He – 10% iC_4H_10O

Basic building block:
- **MUD**
  - 4.6 cm drift Al tube each containing 20 planes of tubes