

Charge to IDTB07 Workshop

IDTB07 Workshop @ Fermilab

Jan. 17 – 19, 2007

Jae Yu

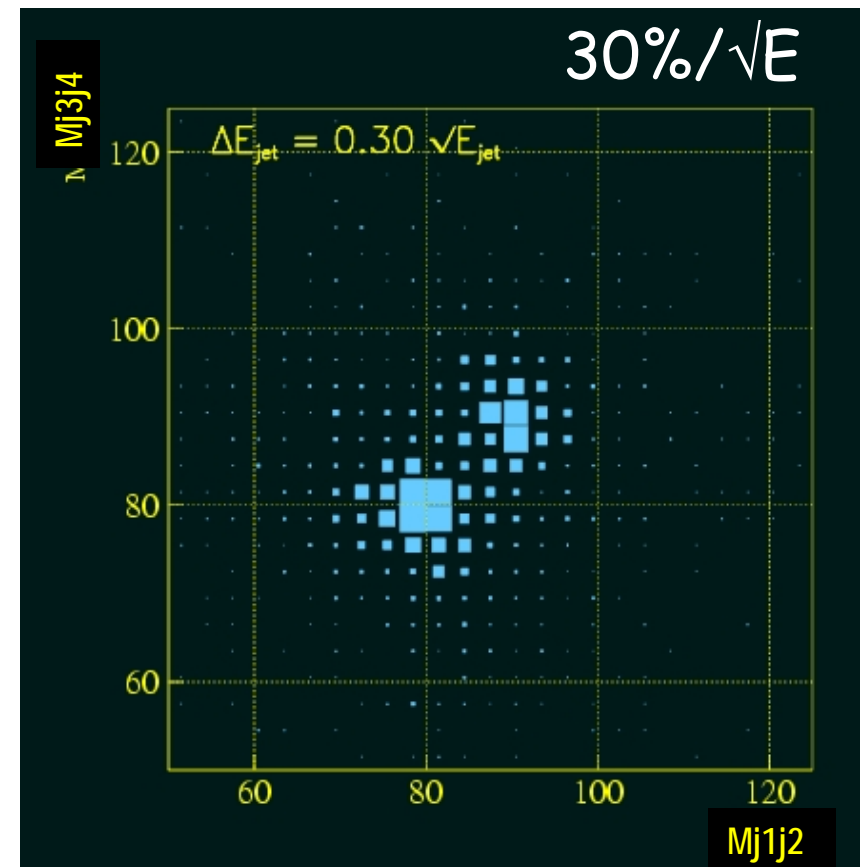
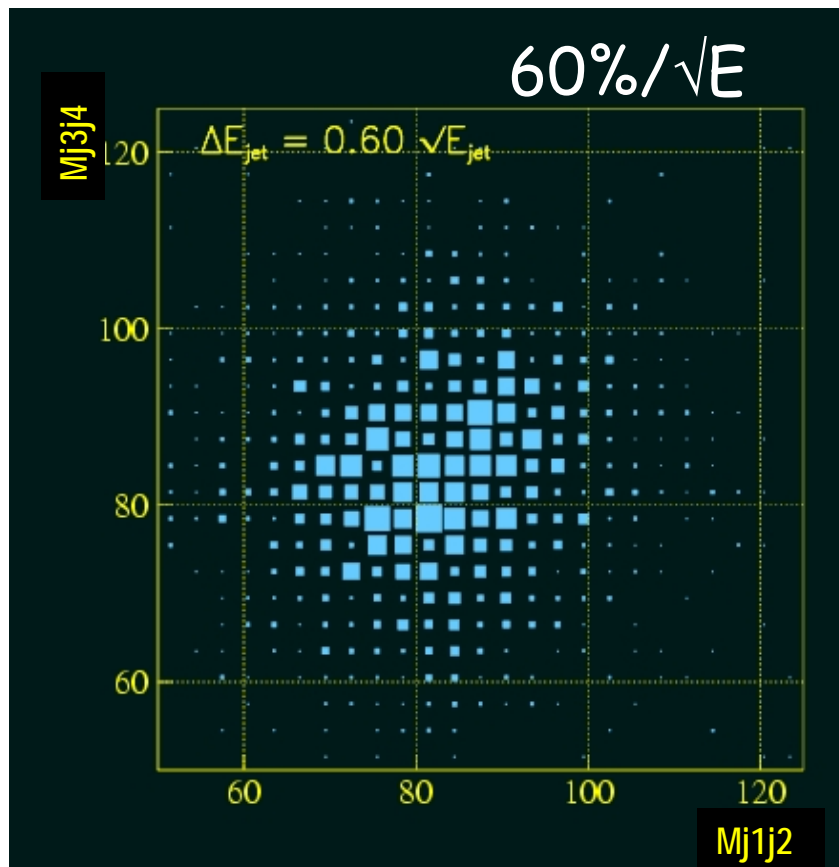
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- Introduction
- Some updates
- The ultimate goal
- The charge

Introduction

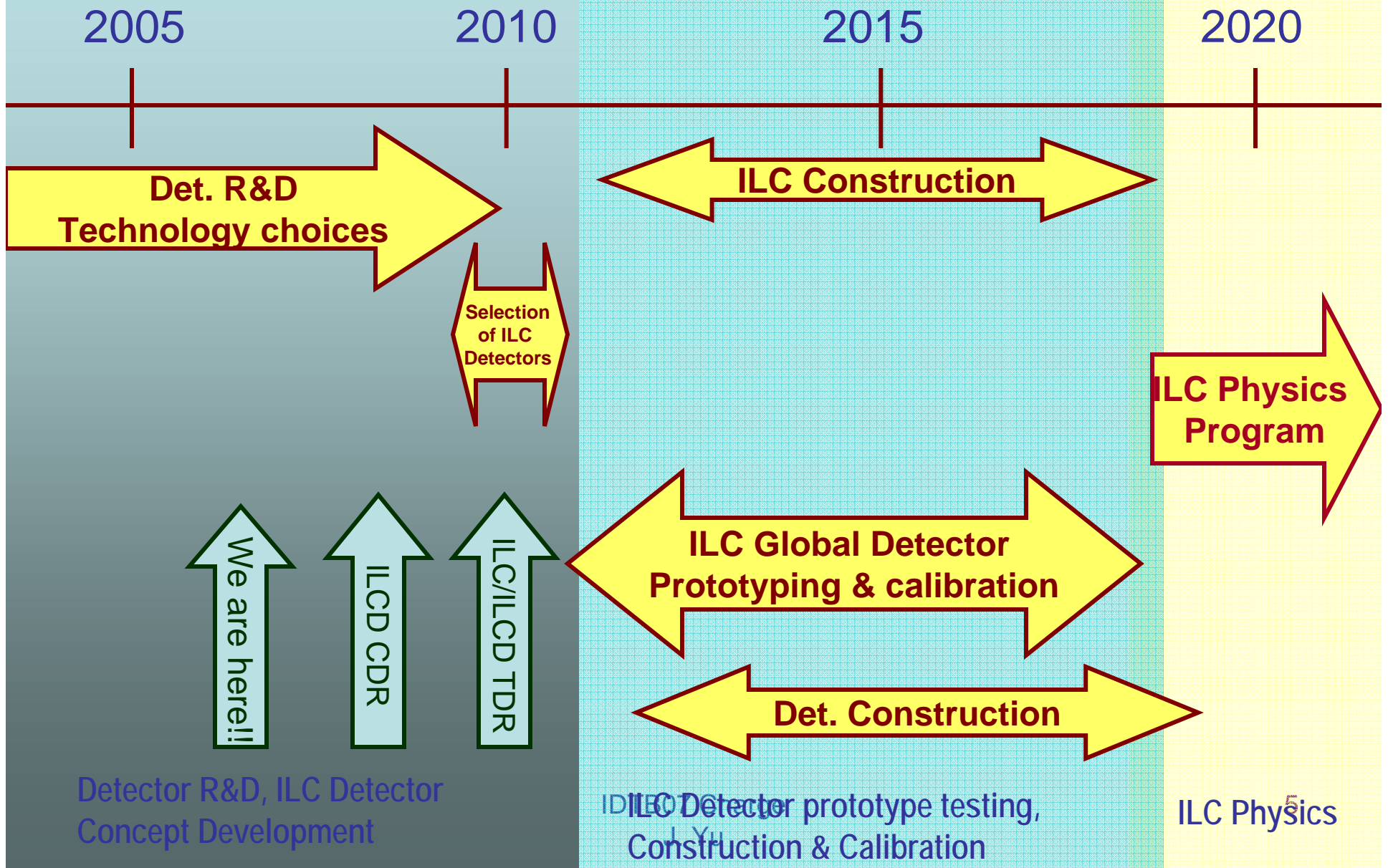
- International Linear Collider is the next generation machine for precision measurement in high \sqrt{s}
- Critical physics measurements
 - Higgs production e.g. $e^+ e^- \rightarrow Zh \rightarrow qqbb$
 - separate from WW, ZZ (in all jet modes)
 - Precision higgs coupling measurements
 - g_{tth} from $e^+ e^- \rightarrow tth \rightarrow WWbbbb \rightarrow qqqqbbbb$
 - g_{hhh} from $e^+ e^- \rightarrow Zhh \rightarrow qqbbbb$
 - Higgs branching ratios $h \rightarrow bb, WW^*, cc, gg, \tau\tau$
 - etc
- All of these physics goals demand
 - Efficient jet separation and reconstruction
 - Excellent jet energy resolution
 - Excellent jet-jet mass resolution

Can Traditional Calorimeter Meet the Requirements?



- ILC Physics demands unprecedented precision in detectors
- GDE making significant progress in defining the machine
- Many detector R&D activities reaching the point for beam tests
- Detector concept studies rapidly maturing
 - CDR anticipated in mid 2008!!
- PFA development speeding up
 - Hadronic shower behaviors need to be better understood
 - Models should be validated
- ILC Detector development time line should be “in synch” with accelerator TDR
 - Informed decision for detector technologies demands performance tests with beam

LC Detector Time Line



Facility News

- EUDET provides much needed beam test infra for detector R&D using DESY and CERN facilities
- CERN offered beam tests in North Beam Line area in 2006
 - Schedule for 2007 was to be decided in Nov. 2006
- DESY will continue offering low energy electron beams up to 6GeV for beam tests
- Proposal for 3GeV electron beam using bremsstrahlung photons at KEK-B HER was **successful** and will be available in spring 2007
- FNAL MTBF Phase I upgrade completed

Detector R&D Beam Tests

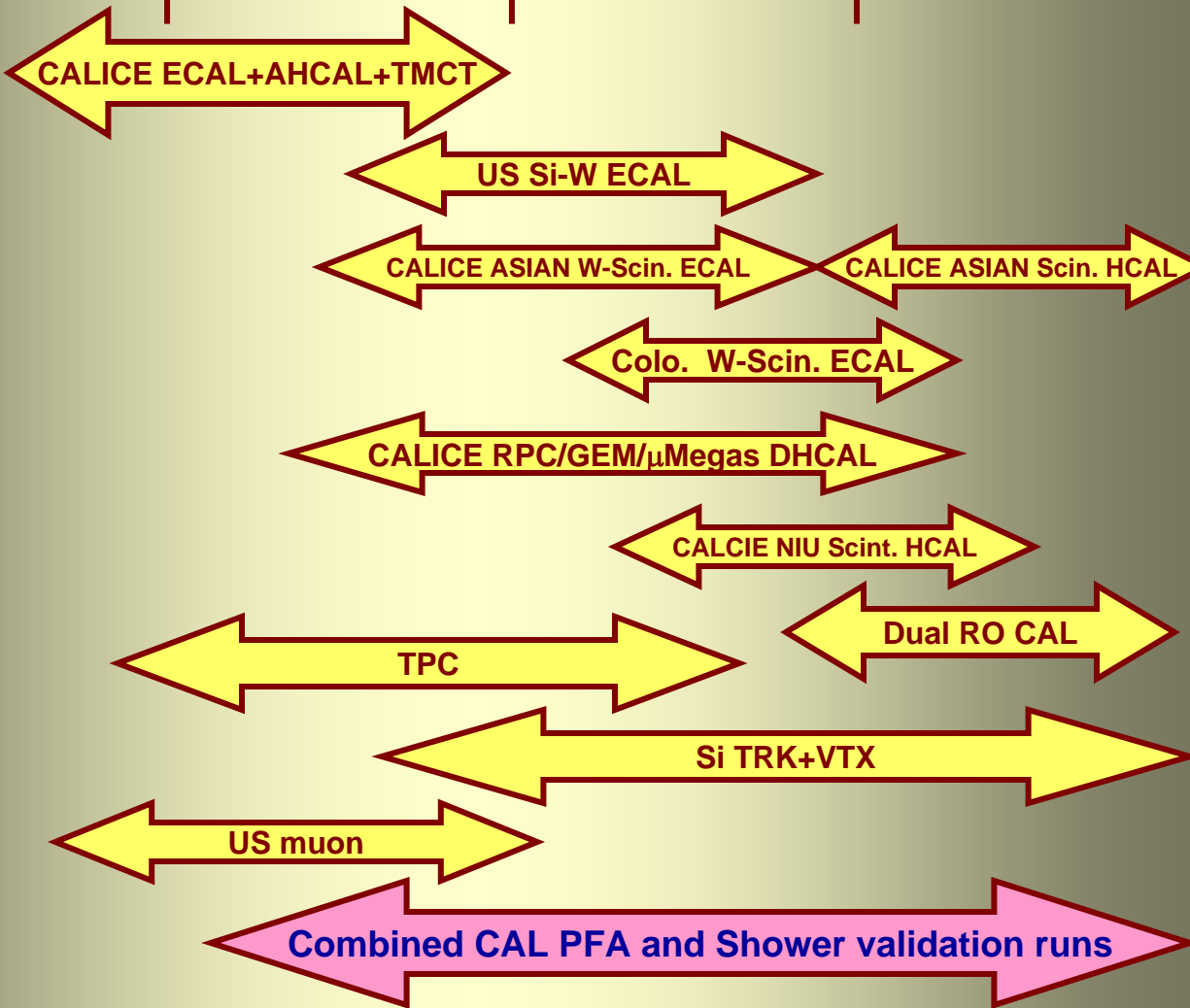
- BI&MDI
 - Seven BI and MDI experiments at SLAC
 - Several more expected in 2007 and 2008
 - Forward and luminosity calorimeter also active
 - KEK ATF utilized for ATF Laser wire, Nano BPM, FONT4, Shintake Monitor and Profile monitor
- Calorimeters & Muons
 - In 2006
 - CALICE ECAL+AHCAL+TCMT beam test at CERN
 - RPC DHCAL beam test at FNAL and GEM DHCAL at KAERI
 - TCMT and Muons at MTBF
 - 2007 – 2009
 - CALICE comprehensive plans along with DHCALs at CERN and FNAL
 - Many muon activities expected

Vertex and Tracking Detectors

- Vertex
 - Significant coordinated effort begun
 - Perhaps a specialized VTX beam test center somewhere?
 - CAP CMOS sensors by Hawaii and KEK and Chronopixel group plans at FNAL
 - LCFI collaboration to test CCD at DESY and FNAL
 - DEPFET program plans serious beam test 2007 – 2009
- Tracking
 - High precision TPC groups (MPI and Carlton)
 - SiLC group plans 1 – 2 Mo of high E beam exposure through 2010
 - Some US Si tracker activities anticipated starting late 2007

Timeline of Beam Tests

2006 2007 2008 2009 2010 >2010



**ILCD #1
Prototyping &
Calibration**

**ILCD #2
Prototyping &
Calibration**

**Phase I: Detector R&D, PFA
development, Tech. Choices**

**Phase II: Global
ILC Det. Proto. &
calibration**

The Ultimate Goal

- To provide a roadmap document to world-wide beam test facility managers, the ILC leadership and funding agencies for ILC detector R&D test beams to be in synch with the time scale of the accelerator
 - Time scale of the information in this workshop should cover the detector R&D test beam needs up to early next decade

Charges

- Review and assess the current status, capabilities and plans of facilities
- Review and assess the current and planned detector test beam activities
- Identify requirements for test beams to meet adequately the detector R&D needs
- Plan and discuss for the future beam test activities
 - What have we learned from LHC beam tests?
 - What can we learn from existing ILC test beam activities?
 - What should the future beam test activities focus?
- Put together a team to write the ILC detector R&D test beam roadmap document which includes all sub-detector systems and the anticipated demands to facilities
 - This document should be completed by summer 2007