EUDET

Detector R&D towards the International Linear Collider

Status and Plans

Joachim Mnich
ECFA ILC Workshop
Vienna, November 2005
EU supported ILC related projects

SIXTH FRAMEWORK PROGRAMME
Structuring the European Research Area Specific Programme
RESEARCH INFRASTRUCTURES ACTION

2003 CARE: Coordinated Accelerator Research in Europe
            Integrated Infrastructure Initiative (I3)

2004 EUROTeV: European Design Study Towards a Global TeV Collider
               Design Study

2005 EUDET: Detector R&D towards the International Linear Collider
            Integrated Infrastructure Initiative (I3)
Description of EUDET

EUDET

- is NOT a detector R&D programme in its narrower sense
  but provides a framework for ILC detector R&D with larger prototypes

- does NOT cover all future needs (financial & human resources)
  additional resources required, e.g. to exploit EUDET infrastructures

- is NOT a closed club
  other institutes (European & non-European) are invited to
    - contribute to the development of the EUDET infrastructure
    - and to exploit it (→ Transnational Access)
EUDET Facts

- proposal submitted March 2005
- successfully passed evaluation
- invitation for negotiations with EU in July 2005
- final budget and project description agreed last week

- anticipated start 1.1.2006
  for a duration of 4 years

Budget:
- 21.5 million Euro total
- 7.0 million Euro EU contribution

Manpower:
- ≈ 57 FTE total
- ≈ 17 FTE funded by EU
EUDET Partner Institutes:

Charles University Prague
IPASCR Prague

HIP Helsinki

LPC Clermont-Ferrand
LPSC Grenoble
LPHNE Paris
Ecole Polytechnique Palaiseau
LAL Orsay
IRES Strasbourg
CEA Saclay

DESY
Bonn University
Freiburg University
Hamburg University
Mannheim University
MPI Munich
Rostock University

Tel Aviv University

INFN Ferrara
INFN Milan
INFN Pavia
INFN Rome

NIKHEF Amsterdam

AGH Cracow
INPPAS Cracow

CSIC Santander

Lund University

CERN Geneva
Geneva University

Bristol University
UCL London

+ 20 associated institutes
The EUDET Map

- EUDET partners
- EUDET associates

Novosibirsk Protvino ITEP MPHI MSU Obninsk KEK (Japan)
I3 projects based on three pillars (mandatory):
- Networking Activities
- Transnational Access
- Joint Research Activities

Structure of EUDET:
Joint Research Activities

JRA1: Testbeam Infrastructure

- **Large bore magnet:**
  - 1.5 Tesla, Ø ≈ 85 cm, stand-alone He cooling, supplied by KEK
  - infrastructure (control, field mapping, etc.) through EUDET

- **Pixel beam telescope**
  - 4 layers of MAPS detectors
  - CCD and DEPFET pixel detectors for validation
  - DAQ system

**Note: all EUDET infrastructure is movable**
- construction & initial tests at DESY
- later exploitation at CERN, FNAL etc. possible
Joint Research Activities

JRA2: Tracking Detectors

- **Large TPC prototype:**
  - low mass field cage (for JRA1 magnet)
  - modular endplate system for large surface GEM & μMegas systems
  - development of prototype electronics for GEM & μMegas

- **Silicon TPC readout:**
  - development MediPix → TimePix
  - TPC diagnostic endplate module incl. DAQ

- **Silicon tracking:**
  - large & light mechanical structure for Si strip detectors
  - cooling & alignment system prototypes
  - multiplexed deep submicron FE electronics
Joint Research Activities

JRA3: Calorimeter

- **ECAL:**
  - scalable prototype with tungsten absorbers
  - Si-sensors & readout chips

- **HCAL:**
  - scalable prototype
  - multi-purpose calibration system for various light sensing devices

- **Very Forward Calorimeter:**
  - laser-based positioning system
  - calibration system for silicon and diamond sensors

- **FE Electronics and Data Acquisition System for the calorimeters**
Networking Activities

Very important part of the project!

- **Information exchange and intensified collaboration:**
  - web based information system
  - annual workshops
  - open for everyone!

- **Common simulation and analysis framework:**
  - development of common software framework
    (testbeam analysis & ILC simulation)
  - small grid based computer cluster

- **Validation of simulation:**
  - e.g. Geant4 shower simulation

- **Deep submicron radiation-tolerant electronics:**
  - access through CERN contracts
Transnational Access

- imposed by the EU to open trans-European access to research facilities
- not really necessary in High Energy Physics

However, we could take advantage of it:

- some travel support for European groups
  - using the DESY testbeam (as of 2006)
  - using the EUDET infrastructures (as soon as available):
    - beam telescope
    - TPC
    - Si TPC
    - Si tracking
    - calorimeter

- Please contact me for details
- most of the resources for the development of the infrastructures

- ramp-up first half 2006
- full swing activities for 2.5 years
- last year: phase-out and exploitation of infrastructures
task leaders are being assigned for the various work packages
annual EUDET meetings and workshops
EUDET Status and Plans

- negotiations with EU successfully concluded (almost)
  on track for project start January 1st, 2006

- informal brainstorming meetings started
  to discuss and define plans, technical issues etc.

- EUDET kick-off meeting
  February 15th - 17th at DESY

- EUDET web page under development
  www.eudet.org

more information soon
Conclusions

- EUDET is latest example for the high recognition of ILC at the EU

- Provides additional funds for European institutes
  - to help in the next phase of ILC detector R&D
  - even more important
  - EUDET can help to raise additional funds at national agency
  - if successful, prepare future collaboration with the EU on the ILC detector

- Additional funds are needed
  - to create and exploit the infrastructures
  - everyone is invited to participate

- EUDET is an ambitious programme with a lot of exciting work ahead of us