ALEPH, DELPHI and OPAL Status and Plans(*)

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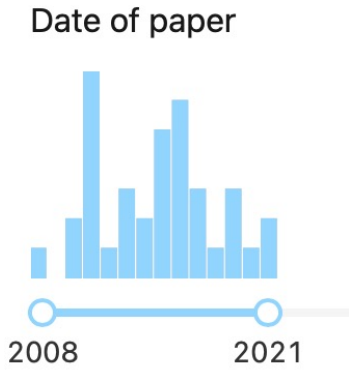
(*)L3 no changes w.r.t. previous status report

LTDP @LEP: Big Data Today – Peanuts Tomorrow

New physics with Archeodata



PHYSICAL REVIEW LETTERS **123,** 212002 (2019)

Measurements of Two-Particle Correlations in e^+e^- Collisions at 91 GeV with ALEPH Archived Data

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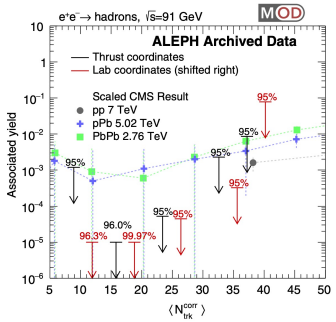

17 January 2020

Physical interpretation of the anomalous Cherenkov rings observed with the DELPHI detector

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On long-range pionic Bose-Einstein correlations
– Including analyses of OPAL, L3 and CMS BECs –

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Intro

- LTDP by definition is independent on digital technology to avoid digital obsolescence
- Common practice in Observational Science FITS/NASA/ESA etc... each observation is unique
- In experimental science reproducibility is the must, but gigantic experiments are nowadays unique

The LEP use cases

In any moment some new ideas or hints for discovery can happen and interest to go back to existing data is triggered: (not a continuous process)

- Existing data are sufficient
- Need to produce new simulated data

(still annotations, notes, and documentations are needed)

General Status

- 32 bit support is fading away (still some hope in gaming industry)
- 64 bit requires sw changes (validation?).

  (Also bug-corrections pose a validation problem since post ad-hoc corrections/factors to detector simulation are in place)
- There is interest from the communities
  - FCC-ee
  - Heavy ion (high-density physics with e^+e^-)
  - QCD
  - Improved Monte Carlo generators
  - New models
- Technical expertise vanishing
  - LEP Digital objects are heterogeneous

(un)FAIR-ness?
Can a machine action use LEP data?

- Findable: the original catalogues and book-keeping systems are difficult to maintain. Metadata still available
- Accessible: dependencies on old libraires, compilers and os
- Interoperable: a challenge, it needs the consolidation on a single framework providing data
- Reusable: only for experts

More Details: ALEPH

- Data in BOS format, available in EOS
- Analysis Framework in both Fortran and C++
- Simulation/Reconstruction working

The system works up to SLC6 (CVMSFS, VMs and Containers) as is and on CENTOS8
with small modification (not validated)

- Data Discovery system not in a good shape
- Event Display is working fine

More Details: DELPHI

- Data in ZEBRA format, available in EOS
- Analysis Framework (all SW) in GITLAB, F77 and C++
- Simulation/Reconstruction working

The system works up CentOS8 (all in CVMFS)

- Data Discovery system for experts
- Event Display working, depends on GPHIGS (licence)

More Details: OPAL

- Data in ZEBRA format
- Analysis Framework in Fortran
- Simulation/Reconstruction working

The system works up to SLC6 (on CVMFS)

- Data Discovery system for experts
- Event Display depends on GPHIGS (licence)

More Details: ALL

- MC production system not maintained. New samples can be easily generated ("by hand")
- Documentation is available. Few notes need some check.
- Strong dependence on CERNLIB
  (discontinued central build/test process)
- Vanishing expertise concerning the detector and software strengths and weaknesses

DPHEP-LEP-TF

- The DPHEP-LEP-TF has been revamped
  chaired by Dirk Duellmann
- Short meeting every week
- LEP "position paper" ongoing
- Discussion on some common project

Documentation

LEP started on paper

- Automatised/outsourced scanning resulted in reduced quality

MiniProject under construction

OCR to identify problem, to make doc searchable

DELPHI 82/1
31 January 1982

CERN/LEPC/82-8
LEPC/I6
25.3.1982

DELPHI

A DETECTOR WITH LEPTON, PHOTON AND HADRON IDENTIFICATION

Letter of intent for an experimental program at LEP

Knowledge

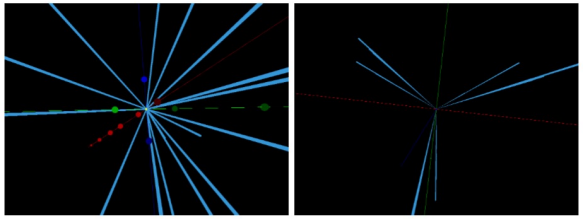
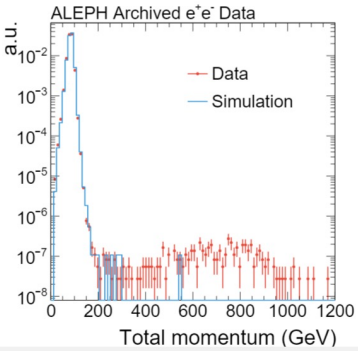


Figure 1: Example of the "Mercedes-Benz" events. The thin lines indicate the axes (x = red, y = green, z = blue). Light blue lines are the particles, with the length proportional to the momentum of the particle. The particles are all around 40 GeV. The right panel show the view from the $-z$ direction. Each of the three branches typically has 4-7 particles.



ALEPH 88-79
TPCCAL 88-01
A. Voigtlander et al.
7.7.1988

Using the Laser Calibration System to Measure Drift Velocity and Electric Field in the ALEPH-TPC

A. Voigtlaender-Tetzner
M. Schmelling
University of Mainz

Data

Low user access frequency implies increased risk of losses

MiniProject under construction

an (storage-) independent LEP-wide file catalogue to allow

- the detection of issues independent from user activity
- the inclusion of new preservation service functions:
    1. periodic validation of catalogue content
    2. confirmation of data accessibility (on-disk/tape)

(Controlled) Data Access

- Different Data formats impose the use of the Different analysis frameworks each depending on non maintained libraries

MiniProject under contruction

Feasibility study to translate reduced datasets to edm4hep format

Bridging to FCC.

Metadata

- Organised in a way that expertise is required

MiniProject under examination

Evolve file catalogue to Data Discovery system

(make the LEP data FAIR?)

Conclusive Remark

- LEP Data are still used as soon as new ideas can be tested
- The DPHEP-LEP-TF is working to improve the view of future perspective of the LEP LTDP
- A more general (experiment-independent) Long Term strategy is needed