



## 4th DPHEP Collaboration Workshop

JADE 2024

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DPHEP  
October 2-3, 2024  
MPP-CERN, ZOOM

- Experiment at PETRA storage ring (DESY), active from 1979 to 1986.
- For  $e^+e^-$ -collisions with COM energy from 12 GeV to 46.6 GeV.
- Co-responsible for e.g. gluon discovery, establishing jet-physics.

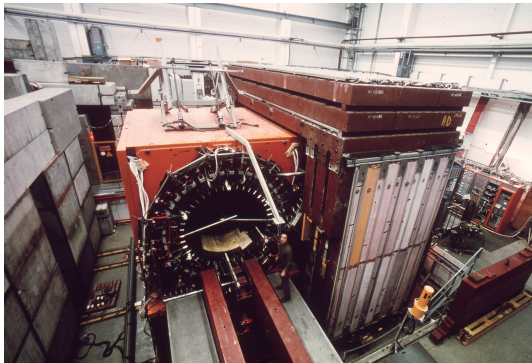


Figure: Jade Inner Detector and Muon System

# JADE Legacy

- JADE legacy was preserved by group of Siegfried Bethke in MPP and interested people in other laboratories (e.g. Jan Olsson in DESY).
- Successful software resurrection and data reprocessing, and QCD analyses in the 2010s, e.g. [1].
- Active JADE website <https://wwwjade.mpp.mpg.de/>.
- JADE history paper [2].

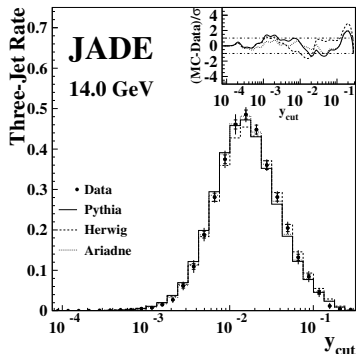


Figure: Measurements from Ref. [1]

# What happened to all the Data?

- Data includes all stored events, Computing Notes, Logbooks (< 1TB)
- First stored on 6500 IBM tapes and then 600 cartridges
- Superseded by storing it on MPCDF's OwnCloud, CERN EOS and locally on its archive file system
- Data made officially public in 2022 ( see the statement in backup)
- All data are to be published on CERN OpenData
- Grants easy public access and is in the interest of better documentation



# Computing Notes

- Short articles describing e.g. the data storage system, changes in the algorithm or containing usage instructions

JRCE - Computer Note No. 23

3.3.1979  
V. Bartel

I O H - Data - Banks

This note contains a description of the raw data banks and the result bank on IBM - tapes as of March 13, 1979.

The format and content of the data banks TRIS, SCAL and ATST had not yet been decided.

The relevant JRCE computer notes, describing the various result banks are attached to this note. By the time this note was issued, the JRCE computer notes No. 16 and No. 22 were still in preparation.

A JRCE computer note describing the banks TRFX, TRFX, TRFX will be issued later by S. Yamada.

\*\*\*\*\*  
JRCE COMPUTER NOTE - No. 24  
\*\*\*\*\*  
T.MEAS1 27.07.1981  
\*\*\*\*\*  
NEW FROM THE COMPUTER CENTER WHICH HAS BEEN USED FOR THE DATA TAKEN IN 1981 AND DESCRIBED IN THIS NOTE.  
\*\*\*\*\*

1) TIME PROFILES  
VINO DEPENDENT TIME PROFILES ARE GIVEN BY PULSER DATA  
\*FZOPAA.PEDEST.MASZBA\*  
ONECALL TO SS BENCH BY

TIME	1-10	11-20	21-30	31-40	41-50
TIME	1-10	11-20	21-30	31-40	41-50

THESE VALUES ARE ESTIMATED FOR LUMINOUS EVENTS TAKEN DURING THE BUNCH TESTS AS OF 1981

2) TIME SLEWING CORRECTION

APPROXIMATELY LAMP  
TICORRECTED=TIMECORRECTED\*DT IN CLOCK

\*) (4\*APPROX\*205)

DT = (4\*205 - 1.122E-20\*APPROX - 2.122E-20\*APPROX\*2)

\*) 22544\*APPROX\*205

DT = (4\*205 - 2.122E-20\*APPROX - 1.062E-20\*APPROX\*2)

\*) 22544\*205

DT = 0

THIS CHANGE IS CONNECTION IS DUE TO THE INSTALLATION OF NEW PULSER IN 1981.

PLEASE BE AWARE OF THE DIFFERENCE BETWEEN THE OLD AND NEW CORRECTIONS AND ABOUT THE PULSER.

JRCE Computer Note No. 22  
P. Dittmann  
31.2.80

How to use the Vertex FIT program

The Vertex program package contains 8 routines:

VTXINI initialization  
VTXPRE(24,17) preparation  
VTXSC vertex search  
VTXEC status conversion  
VTXFS vertex fit  
VTXFIT support routines  
VTXST track correction  
VTXBU(17) "GVX" bank creation (with 305.13)  
VTXWV matrix inversion

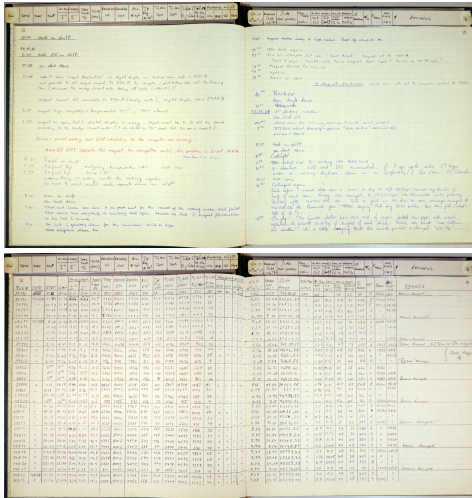
These routines communicate via COMMON/DARG(1,2,3,10). VTXPRE needs the "MCO" and "PAT" banks, the pointers to these banks are passed via subroutine arguments. The results appear in DARG(1), and if one calls VTXSC(17), in bank "GVX". The routines may be called from PULVER, JADES or filled from FILLING.JADES.

The track and vertex parameters used in the package are described in a source comment in subroutine VERTEX.  
This comment is given below:

- All of them were scanned, enumerated and uploaded to CERN OpenData and other storage.

# Logbooks

- All significant incidents and beam parameters were noted down meticulously into handwritten logbooks, totalling ~ 3500 pages



- All of them were scanned and uploaded to CERN OpenData and other storage

# JADE data, computing notes and logbooks in CERN OpenData

open<sup>data</sup>.cern

Important notice: opendata.cern.ch is a quality assurance service. Please use it for testing purposes only. The content may be erased from time to time. Please use opendata.cern.ch for production.

## Raw electron-positron collision event data from the JADE detector (DESY-PETRA)

JADE collaboration

Home About Downloads Data Help Feedback

### Description

All data from the JADE detector at the PETRA accelerator taken from 1978 to 1986 with e+e- collision energies ranging from 12 to 46.7 GeV. JADE was one of the detectors responsible for the discovery of the gluon.

This data was reprocessed in recent years as it had to be moved due to space problems and was migrated multiple times over the years as more compact data storage devices became available.

Article about today's achievements and status of the JADE experiment

### Dataset characteristics

888 files, 598.1 GiB in total

### How were these data selected?

The events from the e+e- collisions were filtered by three trigger levels. The first relied on analog signals from scintillators and lead glass counters and filtered based on energy sums. The second level relied on the tracking chamber only accepted central particles, while the third level was based on signals from the muon system.

### How can you use these data?

User of the JADE software with Oracle, for further information and instructions see the link below.

Usage instructions

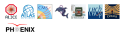
### File indexes

Filename	Size
JAD192_0a_index.txt	750 bytes <a href="#">Download</a>
JAD191_0a_index.txt	808 bytes <a href="#">Download</a>
JAD192_0a_index.txt	700 bytes <a href="#">Download</a>
JAD193_0a_index.txt	898 bytes <a href="#">Download</a>
JAD194_0a_index.txt	700 bytes <a href="#">Download</a>

1 5 10 20 30 40 50 100

### Disclaimer

The open data are released under the Creative Commons CC0 waiver. Neither the experiment(s) (JADE) nor CERN endorse any works, scientific or otherwise, produced using these data. All releases will have a unique DOI that you are requested to cite in any applications or publications.



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## JADE Computing Note 90

Ellen - JADE collaboration

Home About Downloads Data Help Feedback

### Description

JET chamber cell inefficiencies in 1990

### Characteristics

1 files, 108.0 KiB in total

#### Files

Filename	Size
90.pdf	108.0 KiB <a href="#">Download</a>

### Disclaimer

The open data are released under the Creative Commons CC0 waiver. Neither the experiment(s) (JADE) nor CERN endorse any works, scientific or otherwise, produced using these data. All releases will have a unique DOI that you are requested to cite in any applications or publications.

## JADE logbook number 21

JADE collaboration

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### Description

This is JADE logbook 21 from October 7th 1986 to November 3rd 1986 with data taking runs 29617 to 30403 described on 77 pages. These logbooks contain handwritten notes of the JADE online data taking shift crews, logging the status and conditions of the PETRA accelerator and beams, of the JADE detector, of the data taking system, the general properties of all recorded data runs and of actual incidents and decisions concerning the operation of PETRA and of JADE.

### Characteristics

1 files, 16.2 MiB in total

#### Files

Filename	Size
Log21.pdf	16.2 MiB <a href="#">Download</a>

### Disclaimer

The open data are released under the Creative Commons CC0 waiver. Neither the experiment(s) (JADE) nor CERN endorse any works, scientific or otherwise, produced using these data. All releases will have a unique DOI that you are requested to cite in any applications or publications.

- All JADE software sources are publicly available in GitHub [3].
- Due to the updates and cmake build system [4] in the recent years, the reconstruction software can be compiled with modern compiler suites on MacOS and Linux.
- The software is very self-contained. The dependencies include
  - cmake [4]
  - CERNLIB [5] ( so far only 32-bit version works smoothly)
  - ROOT6 [6]
  - HepMC3 [7] for simulated data
- For practical reasons Docker images (Fedora39) with all dependencies is provided[8].
- The final product of execution of software chain are ROOT6 analysis-ready  $N$ -tuples.

Insertion of the JADE SW into the CERN OpenData is WIP.

# Data Analysis

- Selected ROOT6  $N$ -tuples were **regenerated** from the raw JADE data in 2024 without major problems.
- The repository with JADE software provides toy analyses performed on the produced ROOT6  $N$ -tuples.

```
int main(int argc, char **argv) {
    if (argc < 3) {
        std::cout << "Usage: " << argv[0] << " <<input_ROOT_file><<output_pdf_file_without_extension>" << std::endl;
        exit(-1);
    }
    std::shared_ptr<TCanvas> outputCanvas = std::make_shared<TCanvas>("JADE", "JADE", 1024, 768);
    std::shared_ptr<TH1D> outputHisto = std::make_shared<TH1D>("Thrust", "Thrust", 10, 0.0, 1.0);
    TChain* input = new TChain("h10"); //Note the fixed name
    input->Add(argv[1]);
    jadeanalysis* myAnalysis = new jadeanalysis();
    myAnalysis->fChain = input;
    myAnalysis->Init(input);
    for (int gentry=0; gentry<myAnalysis->fChain->GetEntries(); gentry++)
    {
        int entry=myAnalysis->fChain->LoadTree(gentry);
        myAnalysis->fChain->GetEntry(entry);
        outputHisto->Fill(myAnalysis->Tdtc);
    }
    outputCanvas->cd();
    outputHisto->Draw();
    outputCanvas->SaveAs( (std::string(argv[2])+".pdf").c_str());
    return 0;
}
```

Providing (more) toy analyses for JADE into the CERN OpenData is WIP.

- Once the relevant parts of the preserved JADE data/documentation/code are in CERN OpenData, it is expected to request a statement from JADE (and DESY as the host lab).
- JADE can serve as **the example** for LEP experiments.

- JADE data and supplementary materials are available on OpenData test site

## TODO:

- Simplify the software usage and provide more detailed user guides/toy analyses
- Getting the data and supplementary material “officially” published on the OpenData production site

## Thanks:

- Tibor Šimko

Backup slides



# JADE Daten: Beschlussfassung des DESY Direktoriums

From: 'Fleischer, Manfred' <manfred.fleischer@desy.de>  
Subject: JADE Daten: Beschlussfassung des DESY Direktoriums  
Date: 14. March 2022 at 16:16:24 CET  
To: 'Bethke Sigi' <siggi.bethke@cern.ch>

Lieber Sigi,

Auf Deinen Vorschlag hat sich am 10.3.22 das DESY Direktorium in Sitzung 1952 im TDF Sgi die Freischaltung und Behandlung der JADE Daten besprochen:

Beschlussvorlage:  
\*\*\*\*\*

Es ist beabsichtigt, eine Freischaltung und Behandlung der JADE Daten als public and open data zusammen mit den Daten der LEP Experimente, eingebunden in der CERN open data initiative, vorzunehmen. Es geht um alle Daten des JADE Experiments aus den Jahren 1979 - 1986 sowie die Einsicht und Nutzung der Software für die Öffentlichkeit freizugeben.

Dazu wurden Ende letzten Jahres von Sigi Bethke die noch verfügbaren Autoren der JADE Kollaboration befragt. Mit einem einstimmigen Ergebnis der Abstimmung beschloss die Kollaboration, 35 Jahre nach Beendigung des Experiments, die Daten und Software öffentlich zur Einsicht und Benutzung frei zu geben.

Auch DESY in seiner Funktion als Hostlab wird um Zustimmung gefragt: Bau und Betrieb des JADE Experiments wurden zum weitaus größten Teil von DESY finanziert, aus Mitteln deutscher Zuwendungsgeber. Die aufgezeichneten Daten und die dazugehörige Software wurden archiviert und so für die weitere Zukunft gerettet. Sie sind nun zusammen mit Daten von LEP Experimenten in einem Datenfundus verfügbar und werden dort auch zukünftig gepflegt.

Wenn die Daten jetzt allgemein zugänglich werden, besteht natürlich die Gefahr, dass Analysen durchgeführt werden ohne tiefergehende Kenntnisse über systematische Fehler, und vielleicht mit abenteuerlichen Schlussfolgerungen. Dieses Problem hat aber jedes Experiment, nicht nur in HEP, das mit Daten und Software "öffentlich" wird. Deshalb wird vorgeschlagen, dass Autoren von Publikationen in den Acknowledgements folgendes schreiben sollten:

"We thank the JADE collaboration and DESY for making the data and corresponding software publicly available. The data analysis presented here has not been reviewed by these entities and is the sole responsibility of the authors."

Beschluss vom 10.3.22:  
\*\*\*\*\*

Das Direktorium genehmigt die Freischaltung und Behandlung der JADE Daten als "public and open data". Bei Publikationen soll das vorgeschlagene Textelement verwendet werden.

Mit freundlichen Grüessen, Manfred

# Bibliography I

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- [2] Bethke, S. and Wagner, A., The JADE Experiment at the PETRA  $e^+e^-$  collider – history, achievements and revival. *Eur. Phys. J. H* **47**, 16 (2022).  
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- [3] JADE Collaboration, JADE Software, 2024.
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- [6] Antcheva, I. and others, ROOT: A C++ framework for petabyte data storage, statistical analysis and visualization. *Comput. Phys. Commun.* **180**, 2499 (2009).  
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- [7] Buckley, Andy and Ilten, Philip and Konstantinov, Dmitri and Lönnblad, Leif and Monk, James and Pokorski, Witold and Przedzinski, Tomasz and Verbytskyi, Andrii, The HepMC3 event record library for Monte Carlo event generators. *Comput. Phys. Commun.* **260**, 107310 (2021).  
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