4th DPHEP Collaboration Workshop

JADE 2024

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DPHEP
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JADE

- 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.

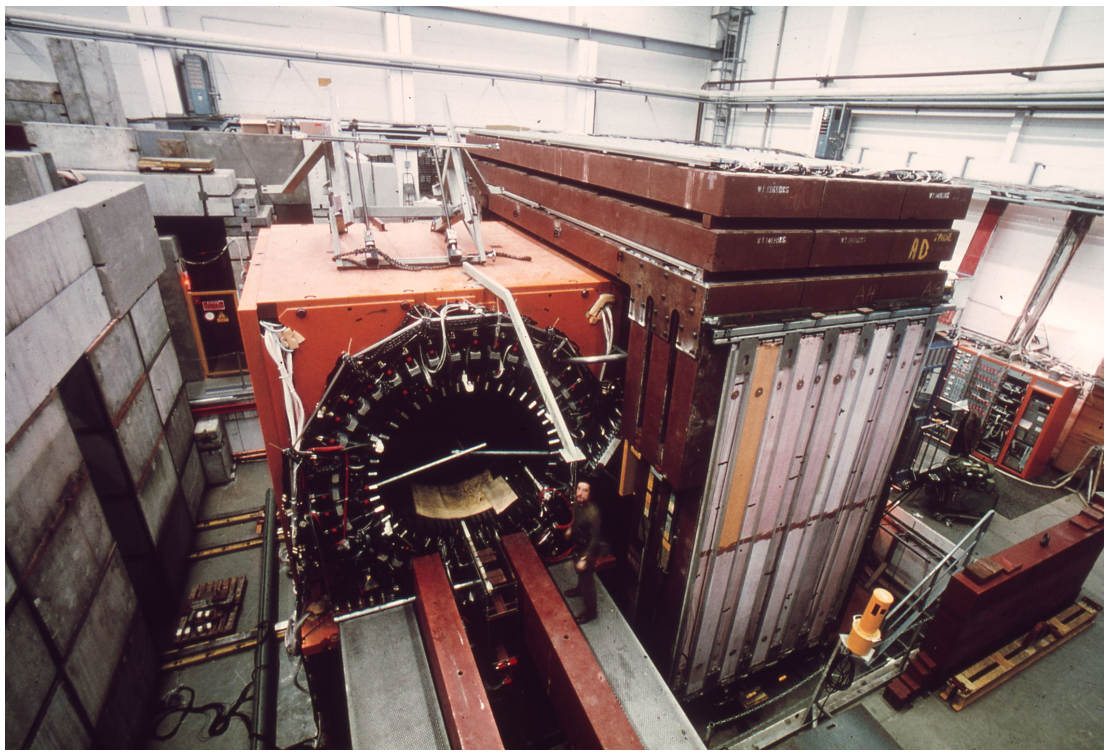


Figure: Jade Inner Detector and Muon System

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].

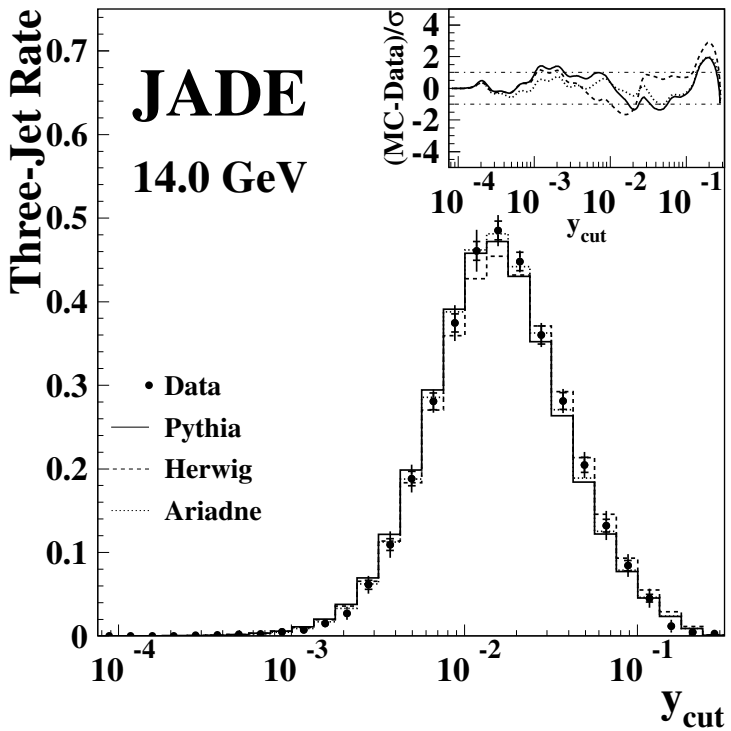


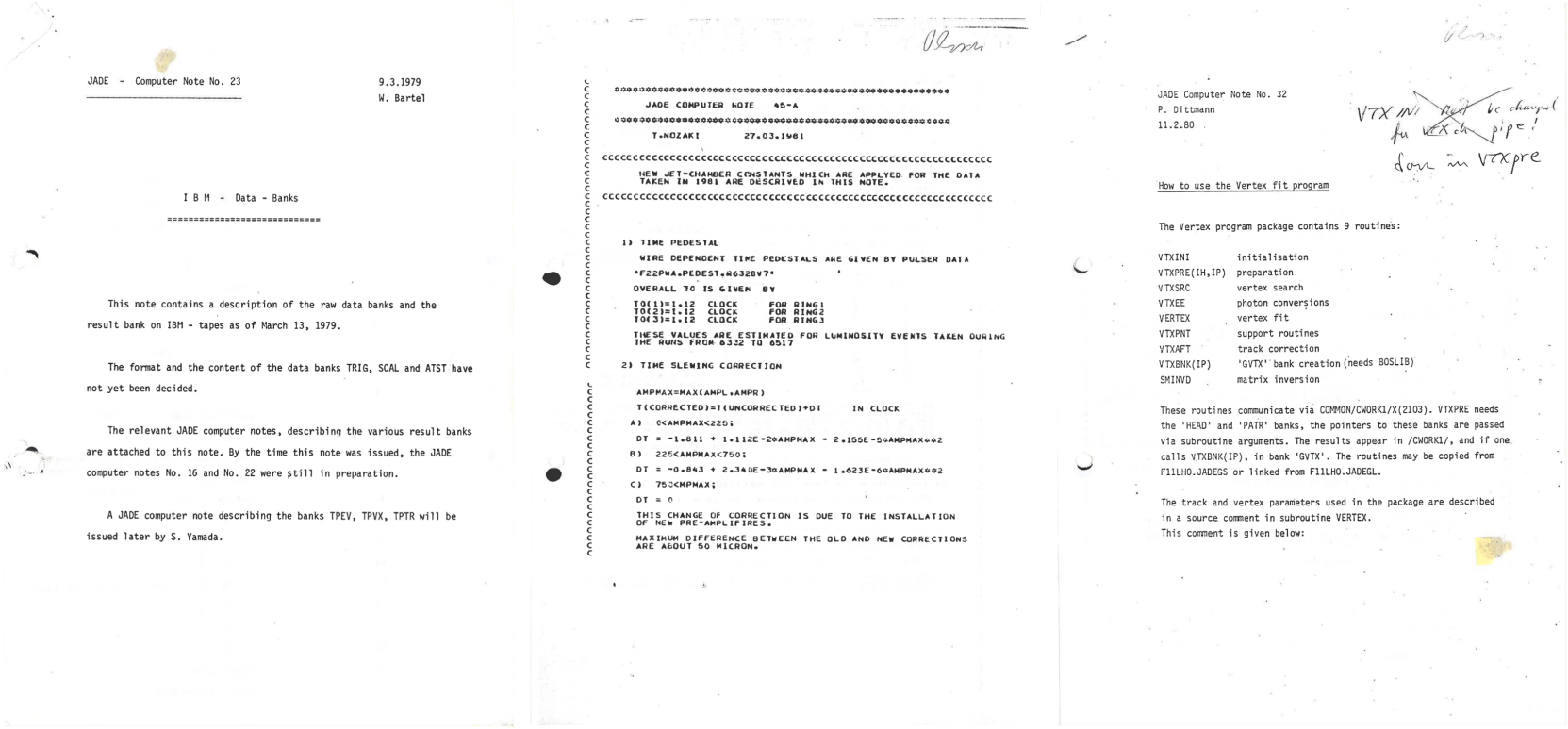
Figure: Measurements from Ref. [1]

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- Superseded by storing it on MPCDF's OwnCloud, CERN EOS and locally on its archive file system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



JADE - Computer Note No. 23 — 9.3.1979 — W. Bartel

I B M - 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 the content of the data banks TRIG, SCAL and ATST have not yet been decided.

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

A JADE computer note describing the banks TPEV, TPVX, TPTR will be issued later by S. Yamada.

JADE COMPUTER NOTE 45-A

T.NOZAKI 27.03.1981

NEW JET-CHAMBER CONSTANTS WHICH ARE APPLYED FOR THE DATA TAKEN IN 1981 ARE DESCRIVED IN THIS NOTE.

1) TIME PEDESTAL

WIRE DEPENDENT TIME PEDESTALS ARE GIVEN BY PULSER DATA

F22PWA.PEDEST.R6328V7

OVERALL T0 IS GIVEN BY

T0(1)=1.12 CLOCK FOR RING1
T0(2)=1.12 CLOCK FOR RING2
T0(3)=1.12 CLOCK FOR RING3

THESE VALUES ARE ESTIMATED FOR LUMINOSITY EVENTS TAKEN DURING THE RUNS FROM 0332 TO 0517

2) TIME SLEWING CORRECTION

AMPMAX=MAX(AMPL,AMPR)

T(CORRECTED)=T(UNCORRECTED)+DT IN CLOCK

A) 0<AMPMAX<225:
DT = -1.811 + 1.112E-2*AMPMAX - 2.155E-5*AMPMAX**2

B) 225<AMPMAX<750:
DT = -0.843 + 2.340E-3*AMPMAX - 1.623E-6*AMPMAX**2

C) 750<AMPMAX:
DT = 0

THIS CHANGE OF CORRECTION IS DUE TO THE INSTALLATION OF NEW PRE-AMPLIFIRES.

MAXIMUM DIFFERENCE BETWEEN THE OLD AND NEW CORRECTIONS ARE ABOUT 50 MICRON.

JADE Computer Note No. 32
P. Dittmann
11.2.80

VTX ... to be changed ... pipe!
... in VTXPRE

How to use the Vertex fit program

The Vertex program package contains 9 routines:

VTXINI	initialisation
VTXPRE(IH,IP)	preparation
VTXSRC	vertex search
VTXEE	photon conversions
VERTEX	vertex fit
VTXPNT	support routines
VTXAFT	track correction
VTXBNK(IP)	'GVTX' bank creation (needs BOSLIB)
SMINVD	matrix inversion

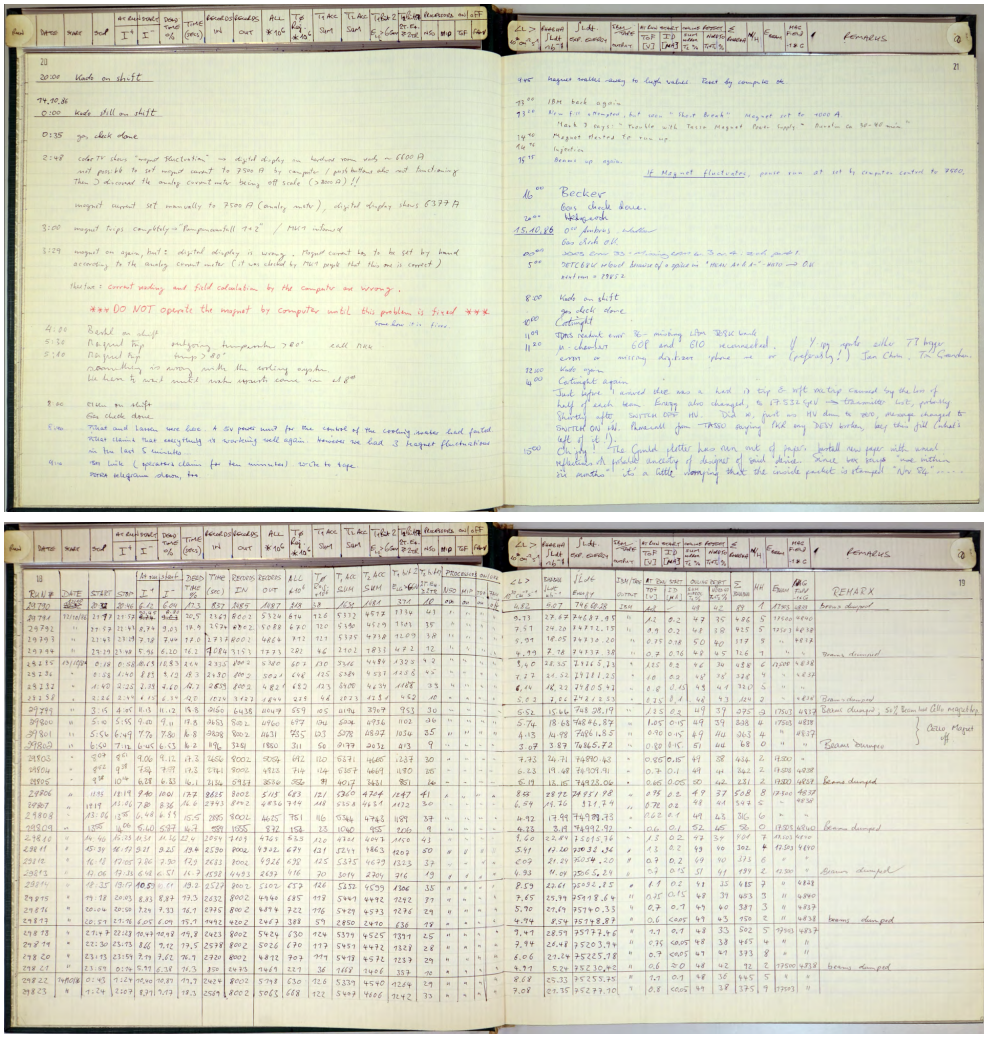
These routines communicate via COMMON/CWORK1/X(2103). VTXPRE needs the 'HEAD' and 'PATR' banks, the pointers to these banks are passed via subroutine arguments. The results appear in /CWORK1/, and if one calls VTXBNK(IP), in bank 'GVTX'. The routines may be copied from F11LHO.JADEGS or linked from F11LHO.JADEGL.

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.

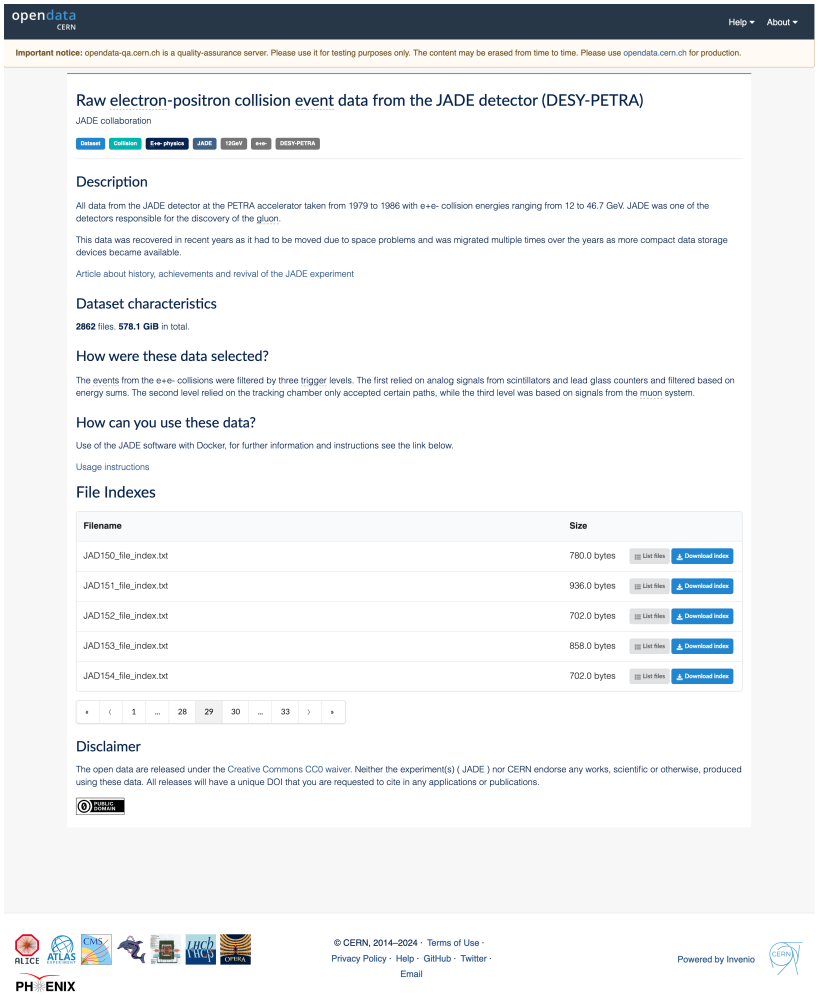
Logbooks

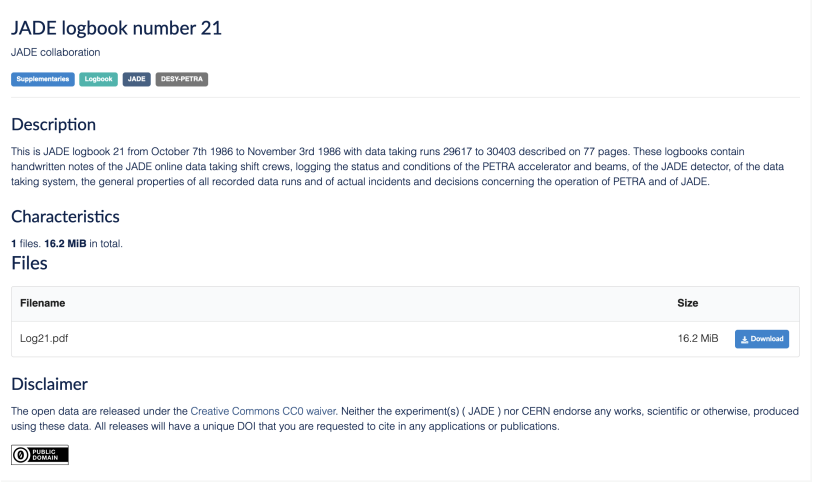
- All significant incidents and beam parameters were noted down meticulously into handwritten logbooks, totalling $\sim$ 3500 pages



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

JADE data, computing notes and logbooks in CERN OpenData





Data Analysis Software

- 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.

Official release on CERN Open Data

- 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.

Outlook

- 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 Siggi' <siggi.bethke@cern.ch>

Lieber Siggi,

Auf Deinen Vorschlag hat sich am 10.3.22 das DESY Direktorium in Sitzung 1952 im TOP 8g1 die Freischaltung und Behandlung der JADE Daten besprochen:

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

Mit freundlichen Gruessen, Manfred

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