```
*************************************************************
****                                                     ****
****       J A D E   C O M P U T E R   N O T E   43      ****
****                                                     ****
****                                                     ****
****        A GENERAL SECOND REDUCTION PROGRAM           ****
****                                                     ****
*************************************************************
```

J.OLSSON 25.08 1980

THE OUTPUT OF THE JADE FIRST DATA REDUCTION STEP CONTAINS C:A 10 % OF THE ORIGINAL TRIGGERS. ALTHOUGH THIS IS A SIZEABLE REDUCTION FACTOR, THE SAMPLE HAS STILL A VERY LOW DENSITY OF GOOD EVENTS. THIS MUST BE SO, SINCE THE REDUC1 STEP IS A VERY TIME-CONSUMING ONE AND THEREFORE MUST WORK WITH SAFE AND WIDE CUTS.

HOWEVER, EVERY RESEARCHER STUDYING A PARTICULAR KIND OF DATA IS FACED WITH THE PROBLEM OF READING > 100 TAPES, TO SELECT HIS GOOD EVENTS.

A SECOND REDUCTION STEP WOULD PARTLY SOLVE THIS PROBLEM. SUCH A PROGRAM MUST AGAIN COMBINE A SIZEABLE REDUCTION FACTOR WITH SAFE CUTS. ON THE OTHER HAND, THE REDUCTION MUST STILL RETAIN ENOUGH BACKGROUND EVENTS TO PROVIDE SAFE ESTIMATES OF BACKGROUNDS IN THE SAMPLES OF GOOD EVENTS THAT EVENTUALLY MAY RESULT. THIS MEANS A COMPROMISE BETWEEN WIDE CUTS AND GOOD REDUCTION FACTOR.

A REDUC2 PROGRAM MUST ALSO BE REASONABLY FAST. TO CREATE A REDUC1 TAPE IN THE GENERATION GROUP JADEPR.REDUC1.G00XXV00, SOME 150-200 CPU-MINUTES ARE SPENT. A REDUC2 PROGRAM SHOULD ONLY SPEND A FEW % OF THIS TIME, TO GIVE THE POSSIBILITY OF RERUNNING IT WITH DIFFERENT CUTS, SHOULD THE NEED ARISE.

A NUMBER OF SECOND REDUCTION PROGRAMS ALREADY EXIST. HOWEVER, THEY ARE MOSTLY SPECIALIZED FOR SELECTING EVENTS OF A CERTAIN KIND, LIKE MULTIHADRONS, BHABHAS, MUPAIRS ETC. IN THE FOLLOWING A PROGRAM IS DESCRIBED, THAT IS DESIGNED TO RETAIN ALL KINDS OF GOOD EVENTS.
THE REDUCTION FACTOR OF THIS PROGRAM, C:A 30 %, IS QUITE MODEST. THIS IS MAINLY DUE TO THE RELAXATION OF ORIGINALLY MUCH HARDER CUTS, IN ORDER TO RETAIN BACKGROUND EVENTS. STILL, THE ORIGINAL NR OF REDUC1 TAPES IS BROUGHT DOWN BY A FACTOR THREE.

THE PROGRAM IS BUILT UP IN A WAY SIMILAR TO THE STANDARD REDUC1 PROGRAM. THUS IS SETS WRITE FLAGS, SEPARATES EVENTS INTO CLASSES ACCORDING TO TRACK LENGTH AND TRANSVERSE MOMENTUM,ETC.. IN ADDITION, SELECTION CUTS ARE ALSO BASED ON TIME OF FLIGHT CHECKS AND LEAD GLASS CLUSTER ANALYSIS. FURTHERMORE, HIGH ENERGY NEUTRAL EVENTS (WHICH ARE ALWAYS KEPT IN REDUC1) ARE ONLY ACCEPTED IF THEY FULFIL A MINIMAL MOMENTUM BALANCE.

THE FLOW CHART OF THE PROGRAM IN SHOWN IN FIG.1. THE POINTS WHICH ARE MARKED W INDICATE SUCCESSFUL EVENT SELECTION, THE POINTS MARKED REJ. INDICATE REJECTION POINTS. THE VARIOUS STEPS OF THE PROGRAM ARE COMMENTED IN THE FOLLOWING.

1. DATA CHECK. RUNS WHICH CONTAIN "NONBEAM" DATA, E.G. COSMIC RUNS OR CALIBRATION RUNS (SUCH RUNS SOMETIMES GET MIXED IN WITH NORMAL DATA IN THE REDUC1 STEP) ARE REJECTED, USING THE SUBROUTINE RDATA.

2. TRIGGER CHECK. THIS STEP IS OPTIONAL, LIKE THE REDUC1 STEP LATER ON. IT PROVIDES THE POSSIBILITY OF REPEATING THE REDUC1 STEP ON DATA WHICH HAS NOT PASSED THE LATEST VERSION OF THE REDUC1 PROGRAM. FOR TIME REASONS, THE SUBROUTINE TRGCHK IS CALLED AT AN EARLY POINT, WHILE THE REST OF THE REDUC1 PROGRAM (WHICH REQUIRES PATTERN RECOGNITION) IS CALLED LATER.

3. PURE LUMITRIGGERS ARE REJECTED IF ETOT (TOTAL LEAD GLASS ENERGY) IS < 100 MEV.

4. OVERFLOW EVENTS ARE REJECTED IF THEY CONTAIN > 1200 HITS IN THE INNER DETECTOR AND < 500 MEV LEAD GLASS ENERGY. MOREOVER, OVERFLOW EVENTS WHICH FLOW OVER BECAUSE OF MANY FIRED LEAD GLASS BLOCKS IN THE BANK ALGL, WHICH ARE THEN KILLED IN THE "BAD LEAD GLASS" STEP, ARE NOT CONSIDERED AS OVERFLOW EVENTS IN THE FOLLOWING SETTING OF THE WRITE FLAG.

5. THE WRITE FLAG IWRT IS COMPUTED WITH THE STATEMENTS:

```
  IWRT=1
  IF(IAC.EQ.0.AND.IFLW.EQ.0.AND.(IFTG.LT.11.OR ETOT.LT.100)) IWRT=0

WITH
   IFLW = 1     IF OVERFLOW EVENT, OTHERWISE  IFLW = 0
   IFTG > 10    IF TAGGED EVENT, OTHERWISE IFTG < 11
   IAC = 1      IF  ETOT > 7000 MEV
             OR IF  ECYL > 3500 MEV   ECYL=ENERGY IN BARREL
             OR IF  ECAP1 > 4000 MEV AND ECAP2 > 500 MEV
             OR IF  ECAP2 > 4000 MEV AND ECAP1 > 500 MEV
   IAC = 0 IF ALL ENERGY IN ONLY ONE ENDCAP BLOCK  (>5000 MEV)
```

THE WRITE FLAG IS USED TO WRITE THE EVENT EVEN IF IT FAILS LATER CHECKS. EXCEPTIONS ARE NEUTRAL EVENTS AND SOME CASES OF COSMIC SHOWERS, SEE BELOW AT POINTS 10 & 20.

6. EVENTS WITH Z-VERTEX OUTSIDE 350 MM AND Z-VERTEX QUALITY FLAG > 1 ARE REJECTED IF IWRT = 0. THIS IS THE SAME CUT AS THE PRESENT REDUC1 CUT. EARLY DATA HAD A REDUC1 CUT FOR Z-VERTEX OUTSIDE 450 MM.

7. THE REDUC1 STEP, SEE UNDER POINT 2. THE STEP IS PERFORMED WITH HELP OF THE SUBROUTINE REDONE, WHICH IS DESCRIBED IN A SEPARATE JADE COMPUTER NOTE (NR 42).

8. A DIVISION IS MADE FOR EVENTS WITH AND WITHOUT CHARGED TRACKS. WHILE NEUTRAL EVENTS ARE PASSED ON TO CLUSTER ANALYSIS, EVENTS WITH CHARGED TRACKS ARE PASSED THROUGH A SERIES OF TRACK CHECKS. NEUTRAL TAGGED EVENTS ARE WRITTEN HERE WITHOUT FURTHER CHECKS.

C H A R G E D   T R A C K   C H E C K S:
----

9. TAGGED EVENTS WITH ONLY ONE TRACK ARE WRITTEN DIRECTLY.

10. EVENTS WITH THE WRITE FLAG IWRT=1 ARE NOW WRITTEN, WITH EXCEPTION OF EVENTS WITH A GOOD Z-VERTEX OUTSIDE 200 MM, AND WITH > 95 % OF THE LEAD GLASS ENERGY IN THE BARREL. SUCH EVENTS ARE PASSED THROUGH THE FOLLOWING TRACK CHECKS.

11. EVENTS ARE NOW SPLIT INTO TWO CLASSES, ISTAR = 0 AND ISTAR = 1. FOR ISTAR = 1 EVENTS, AT LEAST ONE GOOD TRACK MUST EXIST. A GOOD TRACK HAS > 16 HITS IN EITHER R-FI OR R-Z FITS, AND HAS A CURVATURE WHICH IS < 0.00135 (CORRESPONDS TO 100 MEV TRANSVERSE MOMENTUM)

12. ONLY ISTAR = 1 EVENTS ARE CONSIDERED FOR FURTHER TRACK CHECKS. EVENTS WITHOUT GOOD TRACKS ARE PASSED ON TO THE CLUSTER ANALYSIS. FOR ISTAR = 1 EVENTS NOW TWO RATIOS ARE COMPUTED:

```
  RATIO1 = ICNTR / IGODTR       RATIO2 = ICNTS / IGODTR
WITH   IGODTR = NR. OF GOOD TRACKS
       ICNTR  = NR OF GOOD TRACKS WHICH ORIGINATE INSIDE THE
                FIDUCIAL CYLINDER WITH  Z < +-200 MM, R < 30 MM.
       ICNTS  = NR OF GOOD TRACKS WHICH ORIGINATE INSIDE THE
                FIDUCIAL CYLINDER WITH  Z < +-200 MM, R < 10 MM.
```

13. THE ISTAR=1 EVENTS ARE NOW SPLIT INTO TWO CLASSES, THOSE WITH RATIO1 > .2 AND THOSE WITH RATIO1 < .2; EVENTS WITH 2 OR 3 TRACKS ARE PASSED ON TO THE FOLLOWING COLLINEARITY CHECK REGARDLESS OF THIS SEPARATION.

14. EVENTS WITH RATIO < .2 ARE SUBJECTED TO TWO CHECKS, DESIGNED TO REJECT COSMIC SHOWERS, AND IF NOT REJECTED ARE THEN PASSED ON TO THE CLUSTER ANALYSIS.

```
15.   EVENTS WITH RATIO > .2 AND NR OF TRACKS < 1 OR > 3 ARE WRITTEN.

16.   EVENTS WITH NR. OF TRACKS = 2 OR 3  ARE TESTED FOR COLLINEARITY
   IN THE THETA ANGLE. IF TRACKS ARE COLLINEAR WITHIN 14 DEG. (.25 RAD)
   THE EVENT IS CONSIDERED FOR TIME OF FLIGHT CHECK. IF NOT, EVENTS
   WITH RATIO1 > .2 ARE WRITTEN, OTHERWISE PASSED ON TO THE CLUSTER
   ANALYSIS.

17.   COLLINEAR EVENTS WITH ETOT < 800 MEV ARE SUBJECTED TO A TIME OF
   FLIGHT ANALYSIS, USING THE SUBROUTINES CORLAR,TOFSMP AND TOFCHK.
   THE RESULTING QUANTITIES, TOFDIF AND TOFSUM ARE CUT WITH:
       TOFDIF > 5.5 AND (TOFSUM.GT.30. OR TOFSUM.LT.-20) --> COSMIC
   (SEE FIGUR 2.)
   COSMICS ARE REJECTED.
   TO BE WRITTEN, REMAINING EVENTS ARE REQUIRED TO HAVE RATIO2 > 0.
   IF NOT, THEY ARE REJECTED.

 C L U S T E R  C H E C K, FOR NEUTRALS AND FAILING TRACK CHECK EVENTS
 ----------------------------------------------------------------------

18.   THE BANK 'LGCL' IS REQUIRED TO EXIST AND HAVE ERROR FLAG = 0.

19.   IF ONLY ONE CLUSTER EXISTS, THE EVENTS ARE REJECTED IF THE ENERGY
   IN THE ENDCAPS IS < 50 MEV. THESE ARE EVENTS WITH A COSMIC IN THE
   LEAD GLASS BARREL (AND POSSIBLY ALSO EVENTS OF TYPE EE --> GAMMA +
   2 NEUTRINOS).
   OTHERWISE 1-CLUSTER EVENTS ARE WRITTEN.

20.   NEUTRAL EVENTS ARE SUBJECTED TO SPECIAL TESTS:
    A. IF THE INNER DETECTOR HAS > 1000 HITS (SUCH EVENTS EXIST), THE
   EVENT IS REJECTED.
    B. A MINIMUM ENERGY BALANCE IS REQUIRED USING THE SUBROUTINE  HWORLD
   12 DIFFERENT HALF-WORLDS IN THE LEADGLASS SYSTEM ARE CONSIDERED. A
   HALF-WORLD CONSISTS OF ALL BLOCKS BETWEEN FI1 AND FI1 + PI, INCLUDING
   ENDCAPS. A HALFWORLD IS EMPTY IF ITS ENERGY IS < 50 MEV.
   EVENTS ARE REJECTED IF THEY HAVE > 1 EMPTY HALF-WORLD OR IF THE RATIO
   BETWEEN OPPOSITE HALF-WORLDS IS < .05.

21.   NEUTRAL EVENTS WITH < 10 CLUSTERS AND ETOT < 3*EBEAM ARE WRITTEN.

22.   ALL REMAINING EVENTS ARE CHECKED FOR COLLINEAR CLUSTERS. THIS IS
   MAINLY TO INSURE THAT GOOD COLLINEAR TWOPRONGS ARE NOT LOST BECAUSE
   OF FAILING INNER DETECTOR OR FAULTY PATTERN RECOGNITION.
   COLLINEARITY IS DEFINED BY
         DELTA(FI) < .20 RAD,  DELTA(Z) <  500 MM   IN THE BARREL.
         DELTA(X),DELTA(Y) < 350 MM                 IN THE ENDCAPS.
   FOR NEUTRAL EVENTS, THE TWO COLLINEAR CLUSTERS ARE REQUIRED TO CON-
   TAIN > 7 % OF THE TOTAL ENERGY.
   EVENTS WITH NO COLLINEARS FOUND ARE REJECTED.

23.   IF THE COLLINEAR EVENT CONTAINS 3-7 TRACKS, HAS ETOT < 800 MEV
   AND IS CLASSIFIED AS ISTAR = 1, THE EVENT IS PASSED ON TO TIME-OF-
   FLIGHT ANALYSIS, SEE ABOVE. THIS IS TO AVOID FEWPRONG COSMICS NOT
   CONSIDERED PREVIOUSLY, OR EVENTS WHERE PATTERN RECOGNITION HAS SPLIT
   TRACKS INTO SEVERAL NEW TRACKS.
   REMAINING EVENTS ARE WRITTEN.

 ------------------

   THE REDUC2 STEP IS STANDARDLY PERFORMED WITH THE REDUC1 TAPES AS
   INPUT. THE OUTPUT TAPES ARE FOUND IN THE DATA GENERATION GROUP

                         F11OLS.REDUCTWO.G00XXV00

   A CATALOGUE OF THIS TAPES AND CORRESPONDING RUN NUMBERS AND BEAM
   ENERGIES CAN BE FOUND IN THE TEXT MEMBER

                         JADEPR.JADESR(REDUCTWO)

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```
THE REDUC2 STEP CAN ALSO BE PERFORMED WITH A SIMPLE SUBROUTINE CALL.
THIS IS DESCRIBED IN JADE COMPUTER NOTE 42.
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JADE COMPUTER NOTE 43
REDUC 2 FLOW CHART

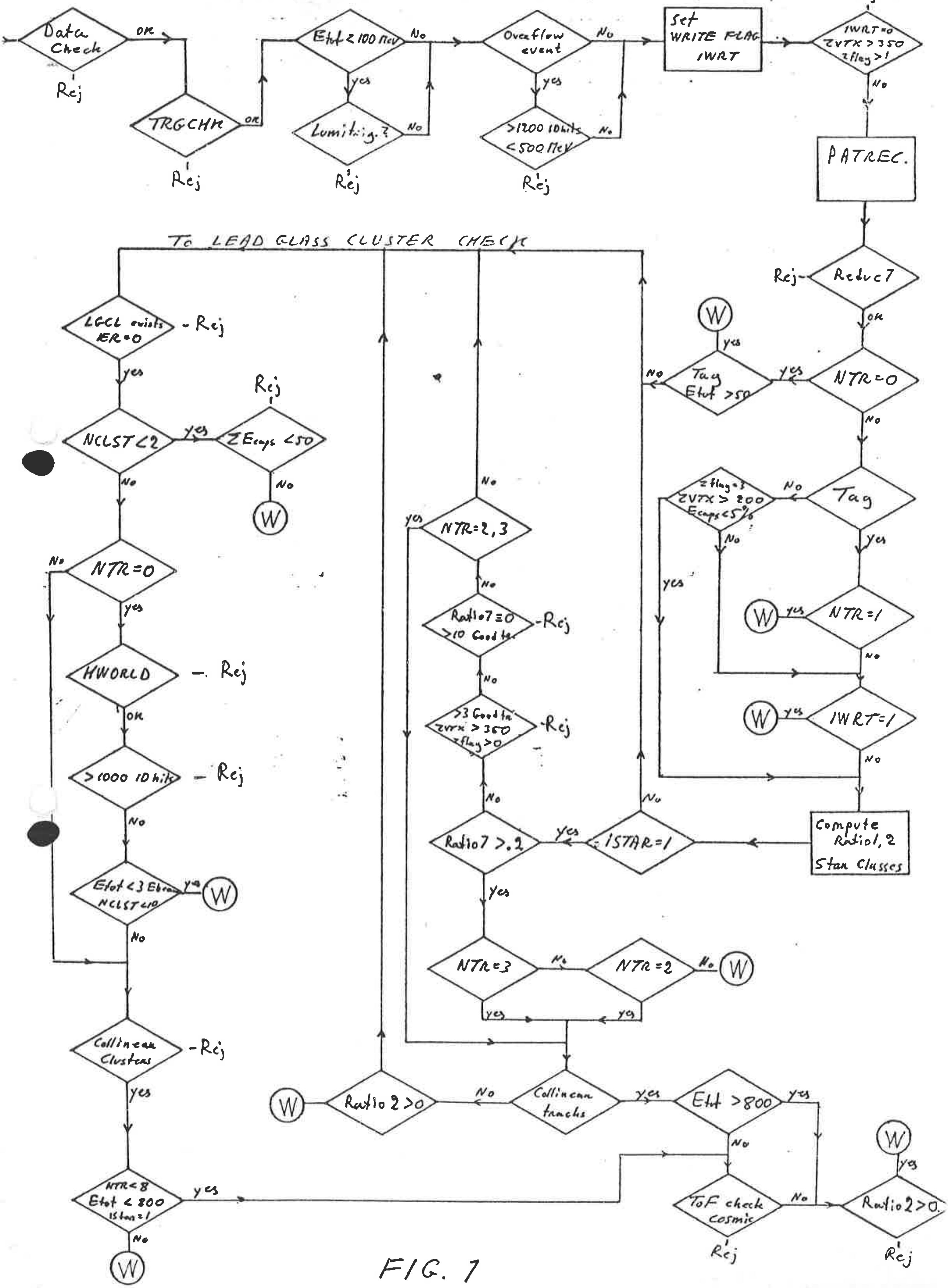

FIG. 7

Olsson

JADE Computer Note ~~43~~ 44

P. Steffen

8.9.1980

Change of JETCAL + improve resolution for tracks close to the wire plane.

1. Change of JETCAL:
   After subtraction of the time pedestale, the drift time is no more set to zero, if it happens to be negative.
   The first bank descriptor word of the calibrated JETC-bank is increased by 200 (in the old version it was increased by 100).

   If a calibrated JETC-bank exists, one can use the subroutine JRECAL for recalibration. The routine is faster than the deletion of the existing calibrated JETC-bank and the subsequent call of JETCAL.

2. The resolution for tracks close to the wire plane can be improved by using the following algorithm for the calculation of the distance from the sense wire:

$$\Delta = \tau \cdot V_{drift}$$

$$\begin{array}{rll} \Delta < -0.63 \text{ mm} : & \Delta_{corr} = 0 \\ -0.63 \text{ mm} < \Delta < 1.80 \text{ mm} : & \Delta_{corr} = (\Delta + 0.63 \text{ mm}) \cdot 0.80 \\ 1.80 \text{ mm} < \Delta < 4.00 \text{ mm} : & \Delta_{corr} = (\Delta + 0.28 \text{ mm}) \cdot 0.93 \\ 4.00 \text{ mm} < \Delta & \Delta_{corr} = \Delta \end{array}$$

   With this correction one obtains a much better resolution for high momentum tracks which are close to the wire plane.

3. FXYZ and JETXYZ will be changed to cope with negative drifttimes.

4. The changes will be done at the 10.9.80.

5. In the coming period of data taking the new JETCAL will be used.

JADE Computer Note 45

T. Nozaki

8.9.1980

New corrections for the space-time relation in the JET chamber.

New correction formulae are given in this note which should be used in the calculation of the space coordinate in the γ-ϕ plane from the observed drifttime.

The explanation of the new corrections will appear in another note in which the analysis of the data performed by using new corrections wil also be shown.

I) The overall corrections which does not vary cell by cell.

The space coordinate Y measured in the drift direction is calculated from the observed drifttime T in the following way.
Y is measured in mm unit and T is measured in clock unit.

I-1) Time pedestral correction before pattern recognition.

True time pedestral is given for each wire by the sum of TOFF(IWIRE,ICELL) and TO(IRING).
TOFF is the wire dependent pedestral which is calculated by pulser data.
TO(IRING) is calculated by using wire crossing tracks for each ring and gives the absolute pedestral:

TO(IRING) is corrected in two steps.
Before pattern recognition, the contribution, TOFIX(IRING) of average flight time and propagation time is also corrected.

T = T-(TO(IRING) + TOFIX(IRING) + TOFF(IWIRE,ICELL))

TOFIX(1) = 0.65 clock
TOFIX(2) = 0.71 clock
TOFIX(3) = 0.76 clock

The values of the TO(IRING) are given in the Table 1.

old constants

RADIL = RADIR = 2.9 mm

new constants

RADIL = 6.8 mm, RADIR = 4.0 mm   for $B \neq 0$

RADIL = RADIR = 5.0 mm   for $B = 0$

I-5) The correction for the aberration due to the variation of the drift velocity near the wire.

$-\infty < Y <$ RVEL; Y = Y + VARVEL x (Y-RVEL) xx 2

Y might be negative very near the wire.

old constants

RVEL = 5 mm, VARVEL = 0.012 1/mm

new constants

RVEL = 2.5 mm VARVEL = 0.048 1/mm

$Y = 0$; $\Delta Y = 0.30$ mm

$Y = -0.5$mm; $\Delta Y = 0.43$ mm

I-6) Change the sign of Y for the hit in the left hand side of the wire plane.

I-7) Correction for the wire staggering.

IWIRE = odd   Y = Y + WSTG

IWIRE = even   Y = Y - WSTG

IWIRE = 1 — 16

WSTG = 0.15 + 0.05 = 0.2 mm

0.15 mm = original wire staggering

0.05 mm = average contribution of the electrostatic force to the wire staggering corresponding to the data which are taken in 1979 and 1980, respectively.

The file is read in such a way:

```
READ (IUNIT) (DLTAR(I),I=1,L)
L = 1536
```

The content of DLTAR is

	symbol	correction
DELTAϕ(96,2)	δ_0	distortion of the overall drift field
DELTA1(96,2)	δ_1	distortion of the drift field around edge wires
DELTA2(96,2)	δ_2	
DELTA3(96,2)	δ_3	dummy
DELTA4(96,2)	δ_4	
DELTA5(96,2)	δ_5	wire position
DELTA6(96,2)	δ_6	
DELTA9(96)	δ_9	Δ(Lorentz angle)
DELTA10(96)	δ_{10}	dummy

The corrected coordinate Ycor is given by subtracting the correction ΔY from the Y calculated so far.

Y is measured still in the drift direction.

ΔY is calculated by summing up the following corrections, namely:

$$\Delta Y = \Delta Y5,6 + \Delta Y9 + \Delta Y0 + \Delta Y1,2$$

$$Ycor = Y - \Delta Y$$

II-1) The correction for the wire positions, ΔY5,6.

$$\begin{aligned}\Delta Y5,6 = \Big[& \{ \mathrm{DELTA6(ICELL,1)} + \mathrm{DELTA5(ICELL,2)} \times \mathrm{ZFT/ZMX} \} \times (\mathrm{WIRE}-8) \\ & + \{ \mathrm{DELTA6(ICELL,1)} + \mathrm{DELTA6(ICELL,2)} \times \mathrm{ZFT/ZMX} \} \Big] \times 10 \\ & / \{ \cos(-\alpha) + \mathrm{SIN}(-\alpha) \times \mathrm{TAN}(\beta) \}\end{aligned}$$

where

$YS(1) = YS(2) = YS(3) = 15$ mm

$WMID = 8.5 + Y(WIRE = 8) \times SIN(-\alpha)/20$

II-4) The correction for the distortion of the drift field around edge wires, $\Delta Y_{1,2}$

For the wires 4 - 13, $\Delta Y_1 = 0$

For the wires 1,2,3

$Y < 0$: $\Delta Y_{1,2} = DELTA1(ICELL,1) \times (WIRE-4) xx2xY$

$Y > 0$: $\Delta Y_{1,2} = DELTA1(ICELL,2) \times (WIRE-4)xx2xY$

For the wires 14,15,16

$Y < 0$: $\Delta Y_{1,2} = DELTA2(ICELL,1) \times (WIRE-13)xx2xY$

$Y > 0$: $\Delta Y_{1,2} = DELTA2(ICELL,2) \times (WIRE-13)xx2xY$

III) The transformation to the standard Jade coordinate system

The coordinate in the standard Jade coordinate system (Xst, Yst) is calculated by using the corrected Y coordinate in the drift direction (Ycor), wire number (WIRE), cell number (ICELL) and Lorentz angle (α) .

$$Xst = ((WIRE-1) \times 10 + FSENSW(IRING) + Y_{cor} \times SIN(\alpha)) \times \cos(\phi) - Y_{cor} \times \cos(\alpha) \times SIN(\phi)$$

$$Yst = -((WIRE-1) \times 10 + FSENSW(IRING) + Y_{cor} \times SIN(\alpha)) \times SIN(\phi) + Y_{cor} \times \cos(\alpha) \times \cos(\psi)$$

where

WIRE = 1 - 16

Table 1 Table of T_o and α_o

Data	RUN No.	Pedestral File	B	old To(1)	old To(2)	old To(3)	new To(1)	new To(2)	new To(3)	old α_o	new α_o	Calibration File
1979 summer	1-1486	F22PWA. PEDEST. R565V2	7000 A	-3.4	-3.0	-2.0	-3.9	-3.9	-3.0	18.5	18.5	F11NOZ. DELTV3. SALL
1979 autumn	1487-1485	F22PWA. PEDEST. R1687V4	7000 A	3.2	3.3	3.3	2.4	2.4	2.4	18.5	18.5	
1979 autumn	1846-2520	F22PWA. PEDEST. R1991V4	7000 A	0.59	0.59	0.59	0.2	0.2	0.2	18.5	18.5	
1980 before mid. of June	2521-3727	F22PWA. PEDEST. R1991V4	7000 A	0.59	0.59	0.59				18.5		
	2521-3727	F22PWA. PEDEST. R2683V4	7000 A				-2.5	-2.5	-2.5		19.5	
1980 after mid of June	3728-	F22PWA. PEDEST. R1991V4	7500 A	1.2	1.4	1.5				19.8^o		F11NOZ. DELTV3. A7502. SALL
	3728-	F22PWA. PEDEST. R4041V4	7500 A				-6.1	-6.1	-6.1		21.0	

Olsson

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C
C   ********************************************************************
C         JADE COMPUTER NOTE    45-A
C   ********************************************************************
C          T.NOZAKI        27.03.1981
C
C  CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C       NEW JET-CHAMBER CONSTANTS WHICH ARE APPLYED FOR THE DATA
C       TAKEN IN 1981 ARE DESCRIVED IN THIS NOTE.
C  CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
C
C
C
C     1) TIME PEDESTAL
C
C       WIRE DEPENDENT TIME PEDESTALS ARE GIVEN BY PULSER DATA
C
C      'F22PWA.PEDEST.R6328V7'
C
C      OVERALL T0 IS GIVEN  BY
C
C      T0(1)=1.12  CLOCK      FOR RING1
C      T0(2)=1.12  CLOCK      FOR RING2
C      T0(3)=1.12  CLOCK      FOR RING3
C
C      THESE VALUES ARE ESTIMATED FOR LUMINOSITY EVENTS TAKEN DURING
C      THE RUNS FROM 6332 TO 6517
C
C
C     2) TIME SLEWING CORRECTION
C
C       AMPMAX=MAX(AMPL,AMPR)
C
C       T(CORRECTED)=T(UNCORRECTED)+DT       IN CLOCK
C
C      A)   0<AMPMAX<225;
C
C       DT  =  -1.811  +  1.112E-2*AMPMAX  -  2.155E-5*AMPMAX**2
C
C      B)   225<AMPMAX<750;
C
C       DT  =  -0.843  +  2.340E-3*AMPMAX  -  1.623E-6*AMPMAX**2
C
C      C)   750<MPMAX;
C
C       DT  =  0
C
C       THIS CHANGE OF CORRECTION IS DUE TO THE INSTALLATION
C       OF NEW PRE-AMPLIFIRES.
C
C       MAXIMUM DIFFERENCE BETWEEN THE OLD AND NEW CORRECTIONS
C       ARE ABOUT 50 MICRON.
C
```

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 ************************************************************
****                                                      ****
****          J A D E   C O M P U T E R   N O T E   46    ****
****                                                      ****
****                                                      ****
****    INSTALMENT OF THE NEW JET CHAMBER CALIBRATION     ****
****                                                      ****
 ************************************************************

E.ELSEN, T.NOZAKI, J.OLSSON, L.O'NEILL, G.PEARCE, P.STEFFEN
                                               27.10.80

  THE NEW JET CHAMBER CALIBRATION, DESCRIBED IN JADE COMPUTER NOTE 45,
IS READY TO BE INSTALLED IN THE GENERAL JADE CALIBRATION SYSTEM. THE
FOLLOWING FILES AND SUBROUTINES ARE AFFECTED:

      CALIBRATION FILES :            F11LHO.ASTART0
                                     F11LHO.AUPDAT0
                                     F11LHO.ASTART1
                                     F11LHO.AUPDAT1

      F11LHO.JADEGS/JADEGL :         SUPERV
                                     KALIBR
                                     KLREAD
                                     JETCAL

      F11GOD.PATRECSR/PATRECLD       FXYZ
                                     PATROL

      F22YAM.TPSOURCE/TPLOAD :       RFEVFT

     THE COMMON /CALIBR/ ALSO CHANGES. PROGRAMS THAT USE EQUIVALENCE
  STATEMENTS TO ACCESS CALIBRATION CONSTANTS WILL HAVE TO BE CHANGED.
  THIS DOES NOT AFFECT MUON ROUTINES, BUT ALL PROGRAMS THAT USE
  CALIBRATION CONSTANTS ACCESSED WITH CALIBR POINTERS BEYOND NR 5,
  E.G. TOF AND DEDX PROGRAMS.

  THE SUBROUTINE   JETXYZ  ON F11GOD.PATRECSR/LD IS COMPLETELY CHANGED
  IN ITS INPUT VARIABLES AND WILL BE REPLACED BY THE NEW SUBROUTINE

                                              HITXYZ

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     IN A RECENT JADE SOFTWARE MEETING THE GENERAL AGREEMENT AFTER
  DISCUSSION WAS TO MAKE THE NEW CALIBRATION AVAILABLE, BUT NOT TO
  REPLACE THE PRESENT SYSTEM DURING THE CURRENT RUNNING PERIOD. FOR
  THE TIME BEING THE ABOVE-MENTIONED SUBROUTINES ARE THEREFORE PRO-
  VIDED UNDER DIFFERENT MEMBER NAMES, WHICH HAVE TO BE INCLUDED.
  THE CALL NAMES REMAIN THE SAME, THOUGH.

  THE MEMBER NAMES ARE:

      F11LHO.JADEGS/JADEGL :         SUPERVN
                                     KALIBRN
                                     KLREADN
                                     JETCALN

      F11GOD.PATRECSR/PATRECLD       FXYZN
                                     PATROLN

      F22YAM.TPSOURCE/TPLOAD :       RFHITXYZ

     TOGETHER WITH THESE INCLUDES ONE MUST ALSO USE THE TEMPORARY
  CALIBRATION FILES:

                                     F11OLS.ASTART0
                                     F11OLS.AUPDAT0
                                     F11OLS.ASTART1
```



```
                                     F11OLS.AUPDAT1

  THESE FILES ARE NOT SITTING ON STOR05 AND ARE SUBJECT TO MIGRATION.

     THE COMPLETE REPLACEMENT OF ROUTINES AND FILES WILL FOLLOW IN THE
WINTER SHUT-DOWN.

     THOSE WHO ARE INTERESTED IN THE NEW CALLING SEQUENCE FOR HITXYZ
SHOULD CONTACT G.PEARCE OR E.ELSEN FOR MORE INFORMATION.
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****                                                           ****
****        J A D E   C O M P U T E R   N O T E   46           ****
****                                                           ****
****                                                           ****
****    INSTALMENT OF THE NEW JET CHAMBER CALIBRATION          ****
****                                                           ****
********************************************************************
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E.ELSEN, T.NOZAKI, J.OLSSON, L.O'NEILL, G.PEARCE, P.STEFFEN
27.10.80

THE NEW JET CHAMBER CALIBRATION, DESCRIBED IN JADE COMPUTER NOTE 45, IS READY TO BE INSTALLED IN THE GENERAL JADE CALIBRATION SYSTEM. THE FOLLOWING FILES AND SUBROUTINES ARE AFFECTED:

CALIBRATION FILES :	F11LHO.ASTART0 F11LHO.AUPDAT0 F11LHO.ASTART1 F11LHO.AUPDAT1
F11LHO.JADEGS/JADEGL :	SUPERV KALIBR KLREAD JETCAL
F11GOD.PATRECSR/PATRECLD	FXYZ PATRCL
F22YAM.TPSOURCE/TPLOAD :	RFEVFT

THE COMMON /CALIBR/ ALSO CHANGES. PROGRAMS THAT USE EQUIVALENCE STATEMENTS TO ACCESS CALIBRATION CONSTANTS WILL HAVE TO BE CHANGED. THIS DOES NOT AFFECT MUON ROUTINES, BUT ALL PROGRAMS THAT USE CALIBRATION CONSTANTS ACCESSED WITH CALIBR POINTERS BEYOND NR 5, E.G. TOF AND DEDX PROGRAMS.

THE SUBROUTINE JETXYZ ON F11GOD.PATRECSR/LD IS COMPLETELY CHANGED IN ITS INPUT VARIABLES AND WILL BE REPLACED BY THE NEW SUBROUTINE

HITXYZ

IN A RECENT JADE SOFTWARE MEETING THE GENERAL AGREEMENT AFTER DISCUSSION WAS TO MAKE THE NEW CALIBRATION AVAILABLE, BUT NOT TO REPLACE THE PRESENT SYSTEM DURING THE CURRENT RUNNING PERIOD. FOR THE TIME BEING THE ABOVE-MENTIONED SUBROUTINES ARE THEREFORE PRO-VIDED UNDER DIFFERENT MEMBER NAMES, WHICH HAVE TO BE INCLUDED. THE CALL NAMES REMAIN THE SAME, THOUGH.

THE MEMBER NAMES ARE:

F11LHO.JADEGS/JADEGL :	SUPERVN KALIBRN KLREADN JETCALN
F11GOD.PATRECSR/PATRECLD	FXYZN PATRCLN
F22YAM.TPSOURCE/TPLOAD :	RFHITXYZ

TOGETHER WITH THESE INCLUDES ONE MUST ALSO USE THE TEMPORARY CALIBRATION FILES:

F11OLS.ASTART0
F11OLS.AUPDAT0
F11OLS.ASTART1
F11OLS.AUPDAT1

THESE FILES ARE NOT SITTING ON STOR05 AND ARE SUBJECT TO MIGRATION.

THE COMPLETE REPLACEMENT OF ROUTINES AND FILES WILL FOLLOW IN THE WINTER SHUT-DOWN.

THOSE WHO ARE INTERESTED IN THE NEW CALLING SEQUENCE FOR HITXYZ SHOULD CONTACT G.PEARCE OR E.ELSEN FOR MORE INFORMATION.

Ulrsan

JADE Computer Note 47

P. Steffen, F11

28.11.1980

New Pattern Recognition Programs

The pattern recognition program PATREC has been improved by adding a program step which runs as a preprocessor before the PATREC-program. In the preprocessor step only those tracks are recognised which:

a) pass at least through ring 1 and half of ring 2,

b) have a transverse momentum of at least $\sim$200 MeV,

c) originate within $\sim$15 mm of the beam axis in the x-y projection.

In order to be registered the track found must fulfil the following condiditons:

1. σ(fit) < 0.32 mm,
2. no gaps of more than 4 hits in the region where no other tracks overlap,
3. tracks stopping before layer 42 (middel of ring 3) must leave the detector in the z-direction.

95% of the tracks which fulfil conditions a, b, c are accepted.

After the preprocessor step the standard PATREC is called using only the yet unassociated hits.

Calling sequence: CALL PATRCO(IND)

IND = 0: only the prprocessor step is executed

= 1: preprocessor step + subsequent PATREC using only unassociated hits are executed

= 2: only the old PATREC is performed

Results:

PATREO is $\sim$30% faster on multihadronic events; on REDUC1-events the program is $\sim$10% slower than the old slow version of PATREC.

The track finding efficiency is only slightly improved.

JADE Computer Note 48
P. Steffen, F11
28.11.1980

SUBROUTINE JREKAL (IERR) on 'F11CHO.JADEGL'

This subroutine performs a recalibration of the JETC-bank. The prior deletion of an existing calibrated bank and the renumbering of the uncalibrated bank must not be done. The subroutine is slightly faster than JETCAL and avoids some problems with BOS for long events.

```
IERR = 0   : everything is OK
     = 1   : no two JETC-banks exist
     = 2   : JETC-bank without hits
```

JADE Computer Note 49

P. Steffen, F11

28.11.1980

SUBROUTINE REFITO(IPTR,IPJHTL,XO,YO,WGHTO) on 'F11GOD.PATRELLD'.

This subroutine refits a track of the PATR-bank (in the x-y-projection) with one additional point (XO.YO) e.g. the production vertex of the event. The measured points are subject to all corrections described in JADE Computer Note 45. The measured points are used in the fit with the weight of 1.0, while the additional point has the weight given by WGHTO. As a consequence the error of the point (XO,YO) is assumed to be $1/\sqrt{WGHTO}$ times larger than the error of the measured points.

IPTR: pointer to Øth word of track array in PATR-bank, e.g. = IPPATR + 8 for 1. track

IPJHTL : pointer to JHTL-bank

XO,YO : coordinates of the vertex [mm]

WGHTO : weight of the vertex (e.g. = .01 $\hat{=}$ $\sigma \approx$ 2 mm)

The result is stored in a track array in /CWORK/ starting from pointer HPTRØ on [use %MACRO GWORKPR and %MACRO CWORKEQ from 'F11GOD.PATRECSR]
The track array in /WORK/ is a copy of the track array in the PATR-bank. Only the fit parameters and the start and end points are replaced by new values. The 2nd word of the track array (program identifier) is set to 32. The 4th word (type of 1. point) is set to 8.

In case of a bad fit and a low momentum track (σ > .24 mm; curvature > .0006, $\hat{=}$ 220 MeV) a second fit is tried using only the hits of ring 1 + 2. If this fit turns out to become better the fit parameters and the start points are changed.

```
Example:  IPPATR = IDATA(IBLN('PATR')
          IPTR = IPPATR + IDATA(IPPATR + 1) + (ITR - 1) * IDATA(IPPATR +3)
          IDATA(IPTR + 1): track number  )
               .                          } track array of 'PATR'-bank
               .                          }
               .                          }
          IDATA(IPTR + 48):              )
```

Olsson

Computer Note 50

R. Eichler

23.2.1981

Miproc Result Bank 'MPRS'

integer x 2 word

1	1	bankdescriptor
2	0	
3	rejection and error flag (see below)	
4	z-vertex in mm	
5	number of tracks found in ring 3 of jet-chamber	
6	free	
7	peak of z-vertex (see Jade computer note 17)	
8	background " (see Jade computer note 17)	
9	flag of z-vertex (see Jade computer note 17)	
10	Miproc event count (= trigger number)	

Rejection and error flag:

bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	Actual reject (N-10 rejects event, if set)		z-vertex reject	T2-reject				last cell in ring incomplete	no hits in R2	wire number > 1536	jetc bank longer 4000	negative data found	illegal hit counter	non increasing wire #	unexpect. interrupt N-2	unexpect. interrupt N-3

Olsson

JADE-Computer Note 51
11.5.1981
M.C. Goddard

A General Routine for the Fast Reconstruction of Jet Events

In the analysis of jet events it is important to be able to reconstruct the jet axes as accurately and as fast as possible. The high reconstruction accuracy is clearly a prerequisite for discriminating tests of the underlying parton dynamics. Just as important is computational speed. Since many thousands of jet events, both data and Monte-Carlo, have to be analysed. An algorithm is not practical if its CPU time is more than a fraction of a second per event.

I describe in this note a general routine for the reconstruction of an arbitrary number of jets. This algorithm reconstructs the jet axes as accurately as any existing method and is two to one hundred times faster[1)]. This dramatic increase in the speed comes about because the standard procedure of partitioning the event is not used. Instead an iterative method is employed to reconstruct each jet in the event. This gives an extremely fast algorithm with a CPU time only weakly dependent on event multiplicity or number of jets.

In the first part of this note the algorithm will be described and compared to existing jet reconstruction methods. I shall describe in general terms these standard algorithms for two, three and four jet reconstruction. This discussion will emphasize their limitations and the necessity for a new approach will become clear. Next, results obtained with this algorithm will be given. The accuracy in reconstructing the parton axes in space and in determining the jet energies will be presented. Then, the CPU time required will be compared to the time taken by existing methods. Finally, detailed instructions will be given on how to use this routine.

lying jet structure. Then the standard procedure is to use contiguous partitions of the projected momenta[3]. The number of contiguous partitions is:

$$\frac{1}{m!}\binom{n}{m}$$

$$\sim n^3/(3!)^2 \qquad \text{for } n \gtrsim 10$$

leading again to a fraction of a second per event. For a four jet event of multiplicity 35 the number of partitions is, according to equation 1, 4.9×10^{19}. Thus a CPU time of 10^{13} years would be necessary to reconstruct the jet axes. This would result in an unacceptably long delay between data taking and publication. This difficulty cannot be circumvented, as was possible for three jet events, because four jet events are not planar and therefore contiguous partitions cannot be used.
The only other existing four-jet algorithm uses three-jet reconstruction in conjunction with a Lorentz Transformation and takes several seconds per event[4]. The conclusion is that the standard methods are not practical for high multiplicity events or for reconstructing more than three jets. The basic problem is that the number of partitions is such a rapidly increasing function of the multiplicity and the number of jets.

This algorithm does not partition the event but uses an iterative method which I will now describe.
Assume we have an initial (zeroth) approximation for the jet axes: $\vec{T}_k^{(0)}$
How these $\vec{T}_k^{(0)}$ are obtained will be described later. Each particle in the event is then assigned to the closest jet axis. These form the set of particles associated with the jet axis for the first approximation: $C_k^{(1)}$.
The corresponding jet axis for the first approximation is then:

$$\vec{T}_k^{(1)} = \sum_{i \in C_k^{(1)}} \vec{p}_i$$

This procedure is repeated giving a $C_k^{(l)}$ and $\vec{T}_k^{(l)}$ for the lth iteration:

$$\vec{T}_k^{(l)} = \sum_{i \in C_k^{(l)}} \vec{p}_i$$

$$C_k^{(l)} = \left\{ \vec{p}_i \mid \text{such that } \vec{p}_i \cdot \hat{T}_k^{(l-1)} \text{ is a max}, \ k=1,\ldots m \right\}$$

The iteration is terminated when

$$\cos^{-1}\left[\hat{T}_k^{(l)} \cdot \hat{T}_k^{(l-1)} \right] < \delta \quad , \text{for each } k.$$

Spatial Reconstruction

The statistical nature of the Field Feynman fragmentation[7] used in the Monte Carlo produces an inherent limitation to the accuracy with which the original parton axes can be determined. Figure 1 shows the angle between the generated parton axis and $\vec{T}_K$ calculated using all of the fragmentation products from the jet. In practical situations where neutrinos and K^0_L are not detected the distributions have RMS's of about 2,4 and 6 degrees for 2,3 and 4 jet events. There is also a long tail for 3 and 4 jet events. These distributions are important because they show the best agreement one can hope for between reconstructed and generated jet axes (within the Field Feynman fragmentation model).

1) Thrust Axis Determination

The determination of the thrust axis of an event is simply the reconstruction of the jet axes assuming an underlying two jet structure with the constraint that the reconstructed jets be back to back.

Figure 2 compares the error in reconstructing the thrust axis for 2 jet events using this algorithm with that from the standard thrust algorithm[8]. The error in reconstructing the thrust axis is slightly better using the present method. This is because to keep the CPU time reasonable the standard algorithm uses only a subset of the particles in an event. Figure 3 shows that the two reconstructed axes are seldom more than three degrees apart. Figure 4 is a scatter plot of the error in reconstructing the thrust axis using this algorithm versus the error using the standard method. The thrust values using the two methods agree to within .01. Similar results are obtained for the reconstructed thrust axis in 3 jet events.

2) Two Jet Reconstruction

A unique advantage of this algorithm is that for two jet events each jet is reconstructed independently. This has many potentially interesting applications, one of which I shall now describe.

The long tails in the error distributions occur when the fragmentation products of jets overlap to a significant extent. This happens either when the partons are close together or when the visible energy of a jet is quite small.

Energy Reconstruction

1) Three Jet Events

The raw reconstructed jet energy for jet K, defined as $E_K^R = \sum_{i \in C_K} |\vec{p}_i|$ is not a good estimator of the original parton energy. This is because the visible jet energy after fragmentation is systematically less than the parton energy, due to neutrinos and K_L^0 escaping detection. In addition, if the jets are not well separated the particles on the boundaries of the jets will be wrongly assigned. On the other hand, the jet directions are not systematically wrong. Given the angle θ_K opposite jet K, the jet energies are uniquely determined[11,12]:

$$E_K = \sqrt{s}\left[\sin\theta_K/(\sin\theta_1+\sin\theta_2+\sin\theta_3)\right]$$

Figure 10 shows the resolution obtained in the reconstruction of the jet energies. The result is considerably better using the above equation rather than the raw reconstructed energies. The energy reconstruction has a sigma of about 1 GeV.

Figure 11 is the parton energy from three jet events compared with the reconstructed jet energy. The reconstruction is not particularly good below a parton energy of about 2 GeV and above 13 GeV. At low energies the jet is very broad and the jet direction is badly determined. When one jet has almost the beam energy the other two jets are very close together and the jet directions are again badly reconstructed. Figure 12 shows that the maximum reconstructed jet energy gives a much better estimate of the underlying parton thrust than does the ordinary thrust value. This means one can get a much better separation of three jet events by reconstructing the jet axes than by using the (non-perturbative) thrust value.

2) Four Jet Events

For a four jet event there is no constraint analogous to that for the index. It will be copied into the output common block of the corresponding track.

The program is invoked by 'CALL MCGJET(NJET,Y)' where NJET and Y are both input arguments. NJET is the number of jets to be reconstructed and Y is a normalized vector in the direction of the event plane normal. For all the results here I have taken Y to be the eigenvector corresponding to the smallest eigenvalue of the sphericity tensor. Y need not be filled for NJET = 2. ?

call spray

2) Output

Normalized vectors corresponding to the reconstructed jet axes are stored in the:
COMMON/MARKET/PAR(3,4)
Where PAR(1,K),PAR(2,K),PAR(3,K) are the X, Y, Z direction cosines of reconstructed jet axis K.

The track assignment for each jet axis is in the:
COMMON/COLD/IJ(4), PTH(3,100,4),IPJ(100,4)

IJ(J) is the number of tracks associated with jet J
PTH(1-3,K,J) contains the X,Y,Z momentum components for the KTH track associated with jet J. K runs from 1 to IJ(J).

IPJ(K,J) is the (input) track index for track K of jet J.

The thrust axis and thrust value are stored in the:
COMMON/CRUST/AXIS(3), THR.
The thrust axis is determined (using a balanced set of vectors). For any call to MCGJET with NJET > 2. When NJET = 2 only the particles in the COMMON/SENSE/ are used.

AX 1 Sphericity
AX 2
AX 2 1
2
AX 3
3 1 - 3
3 - 1

4) The error in reconstructing the thrust axis using this algorithm vs the error using the standard algorithm.

5) The angle between the parton axes vs the energy of the initial state photon for two-jet events.

6) The angle between the visible jet directions. The circles are the results from reconstruction and the histogram is the Monte Carlo prediction.

7) Energy of the initial state photon. The circles are the reconstructed energy and the histogram is the Monte Carlo prediction. The two distributions are normalized to the same number of events in the complete spectrum.

8) The error in the spatial reconstruction of the jet axes for three jet (a) and four-jet (b) events determined by matching the reconstructed axes to the Monte Carlo parton axes.

9) The angle between the reconstructed jet axis and the closest visible jet direction, for four-jet events.

10) The difference between the reconstructed jet energy and the energy of the parton given by the Monte Carlo for three-jet events. The open circles correspond to using raw reconstructed energy and the closed circles are using the energy constraining equation.

11) Parton energy spectrum for three-jet events. The closed circles show the reconstructed jet energy and the histogram is the parton energy from the Monte Carlo.

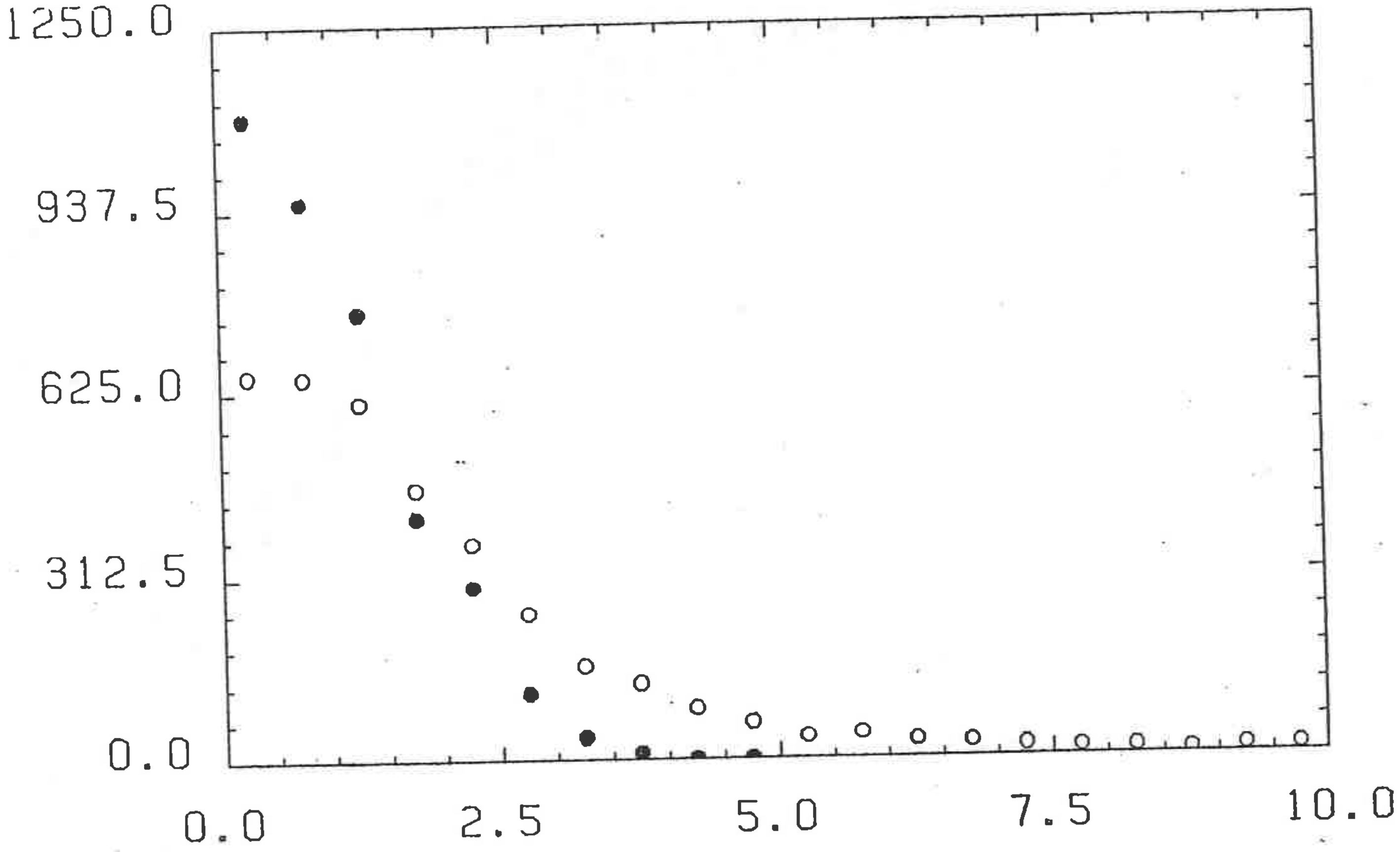
12) The difference between the reconstructed thrust and the parton thrust from the Monte Carlo for three-jet events. The open circles show the result using the (non-perturbative) thrust and the closed circles using the maximum reconstructed jet energy.

13) The difference between the reconstructed jet energy and the energy of the parton given by the Monte Carlo for four-jet events. The open circles correspond to using raw reconstructed energy and the closed circles are using the energy scaling equation.

14) Parton energy spectrum for four-jet events. The closed circles show the reconstructed jet energy and the histogram is the parton energy from the Monte Carlo.

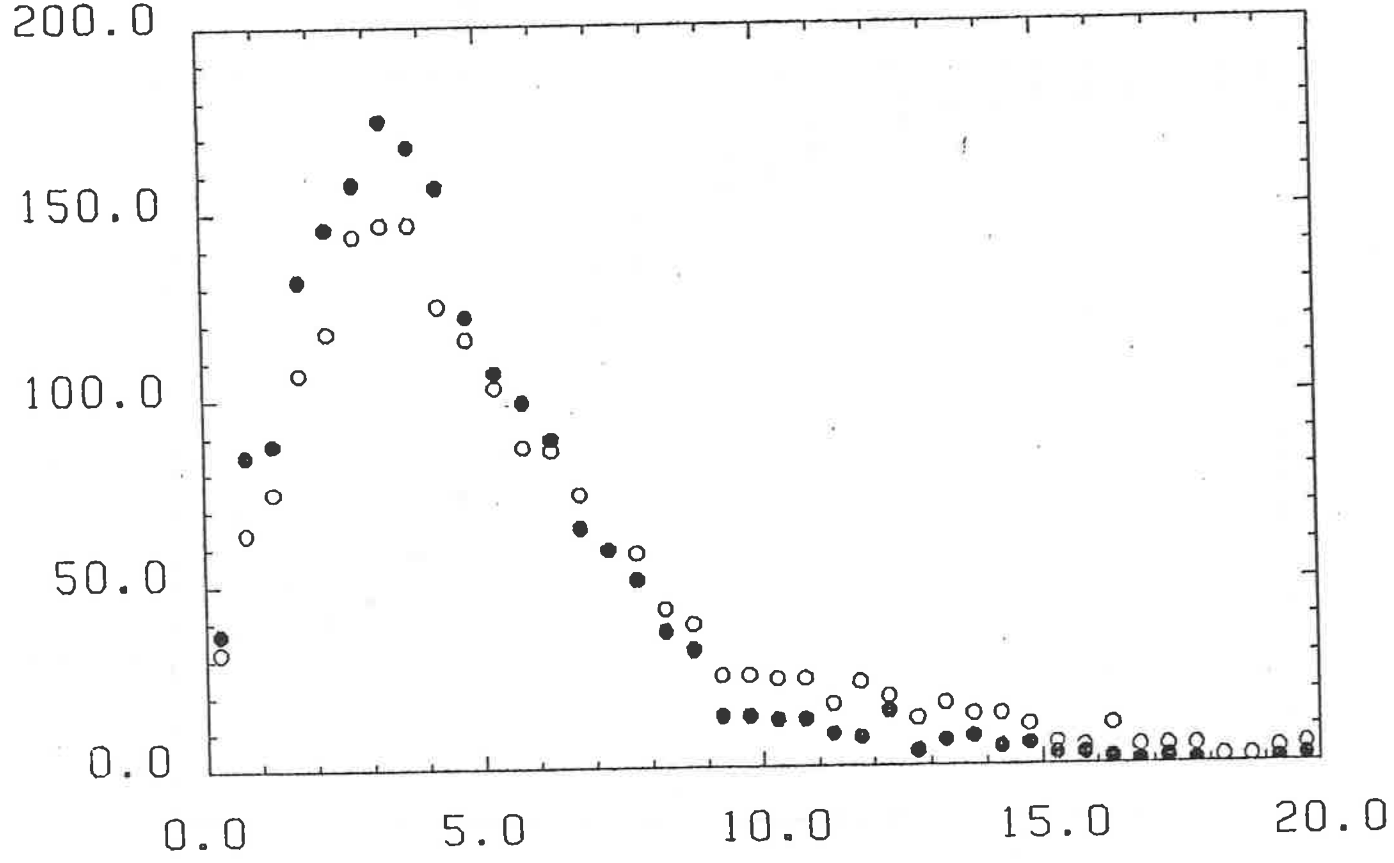
1(a)

DSN=F11GOD.GEP.ERR1
05/03/81 KA 1 1
02.21.35 KB 1 5
KC 0 0
NSYM -2 -12



TWO-JET
ERROR IN RECONSTRUCTING JET AXIS FROM FRAG PRODUCTS (G=0)

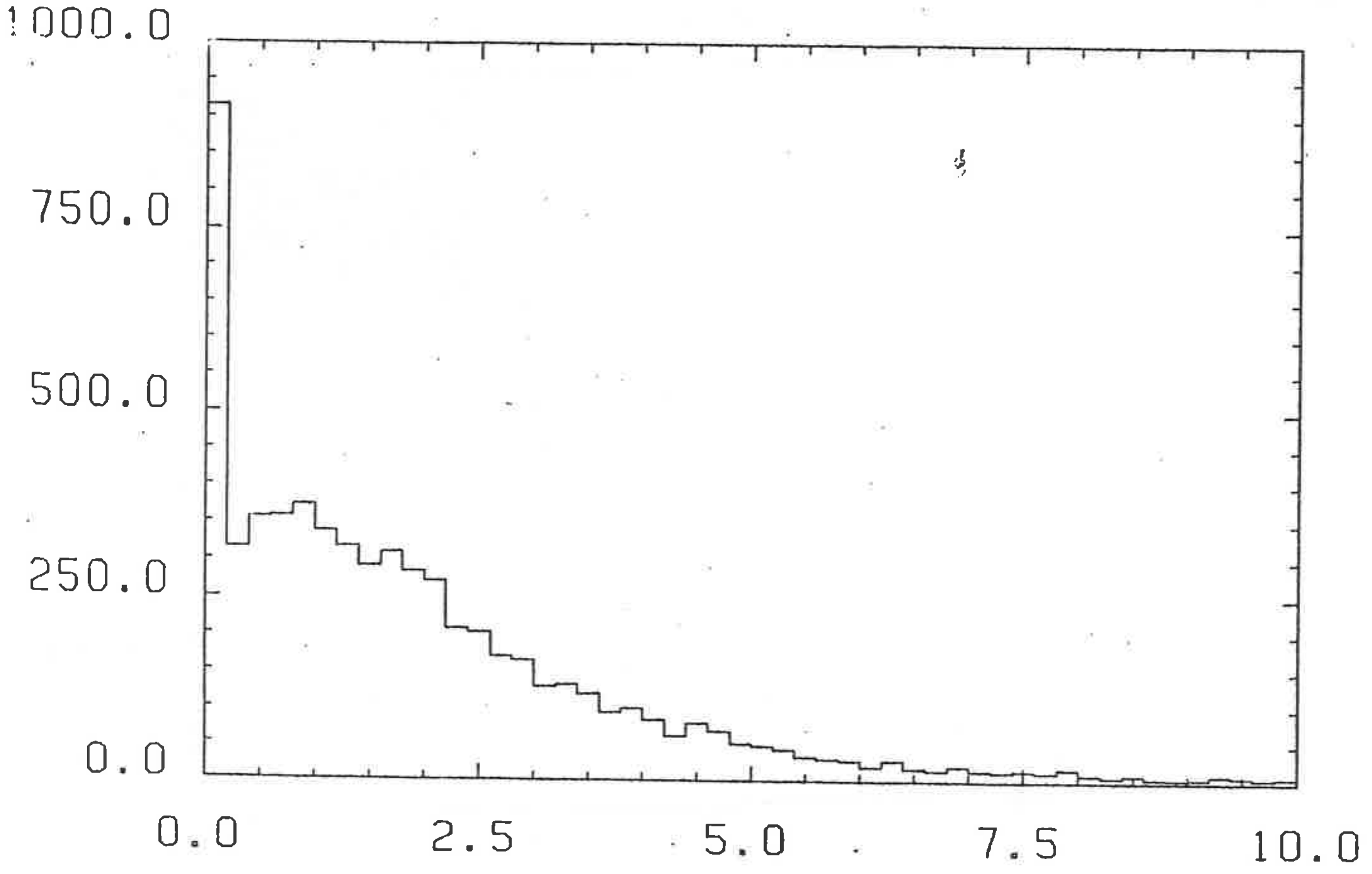
DSN=F11GOD.GEP.ERR4
05/03/81 KA 1 1
0?.37.04 KB 1 5
KC 0 0
NSYM -2 -12



FOUR-JET
ERROR IN RECONSTRUCTING JET AXIS FROM FRAG PRODUCTS (G=0)

1 (c)

DSN=F11G0D.GEP.T2J4V
05/03/81 KA 1
05.04.43 KB 502
KC 0
NSYM 10



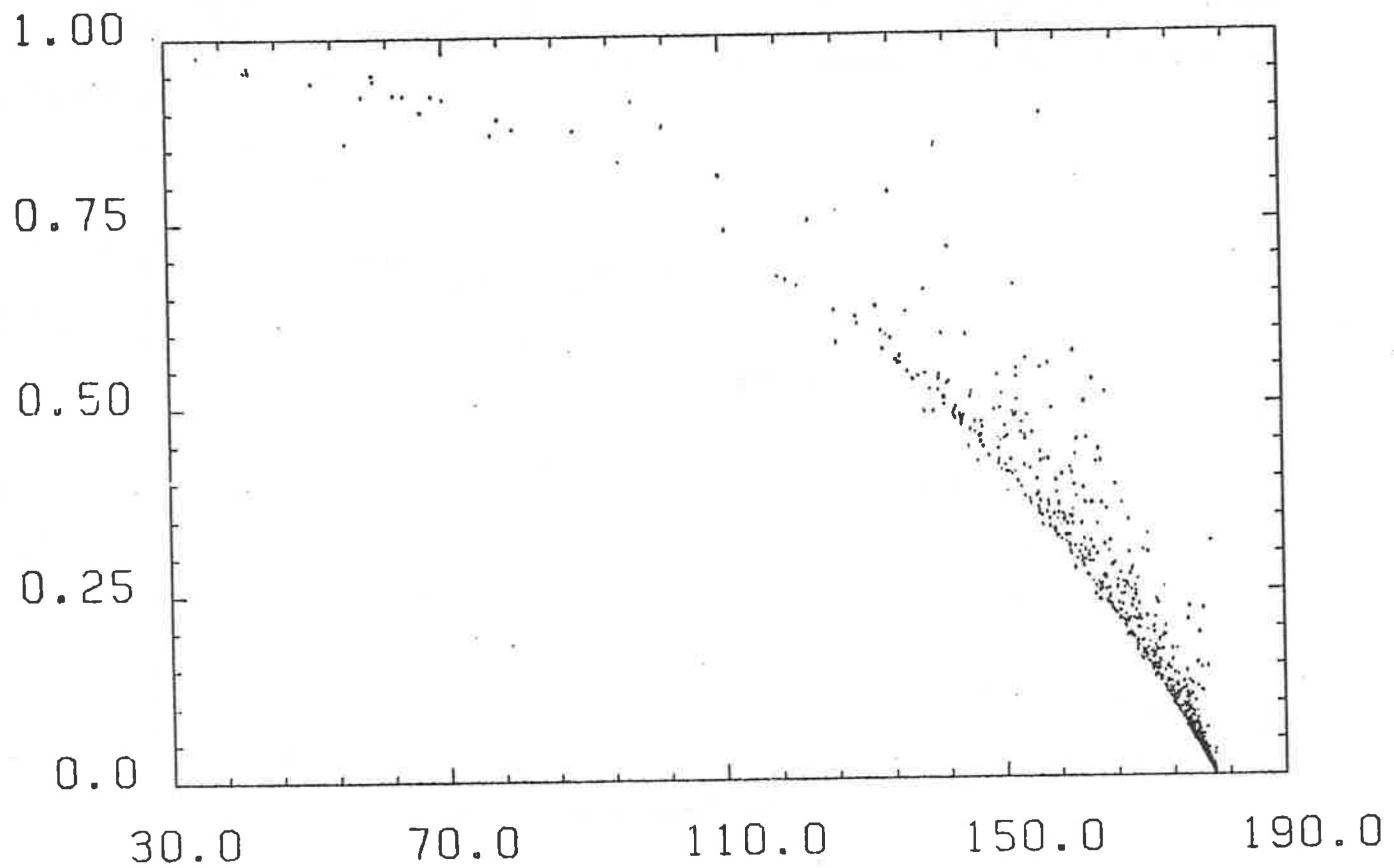
TWO-JET 4 VECT
DIFF AXES

3

3

5

DSN=F11G0D.GEP.T2JTRK
05/03/81 KA 2
06.35.23 KB 511
KC 0
NSYM -3

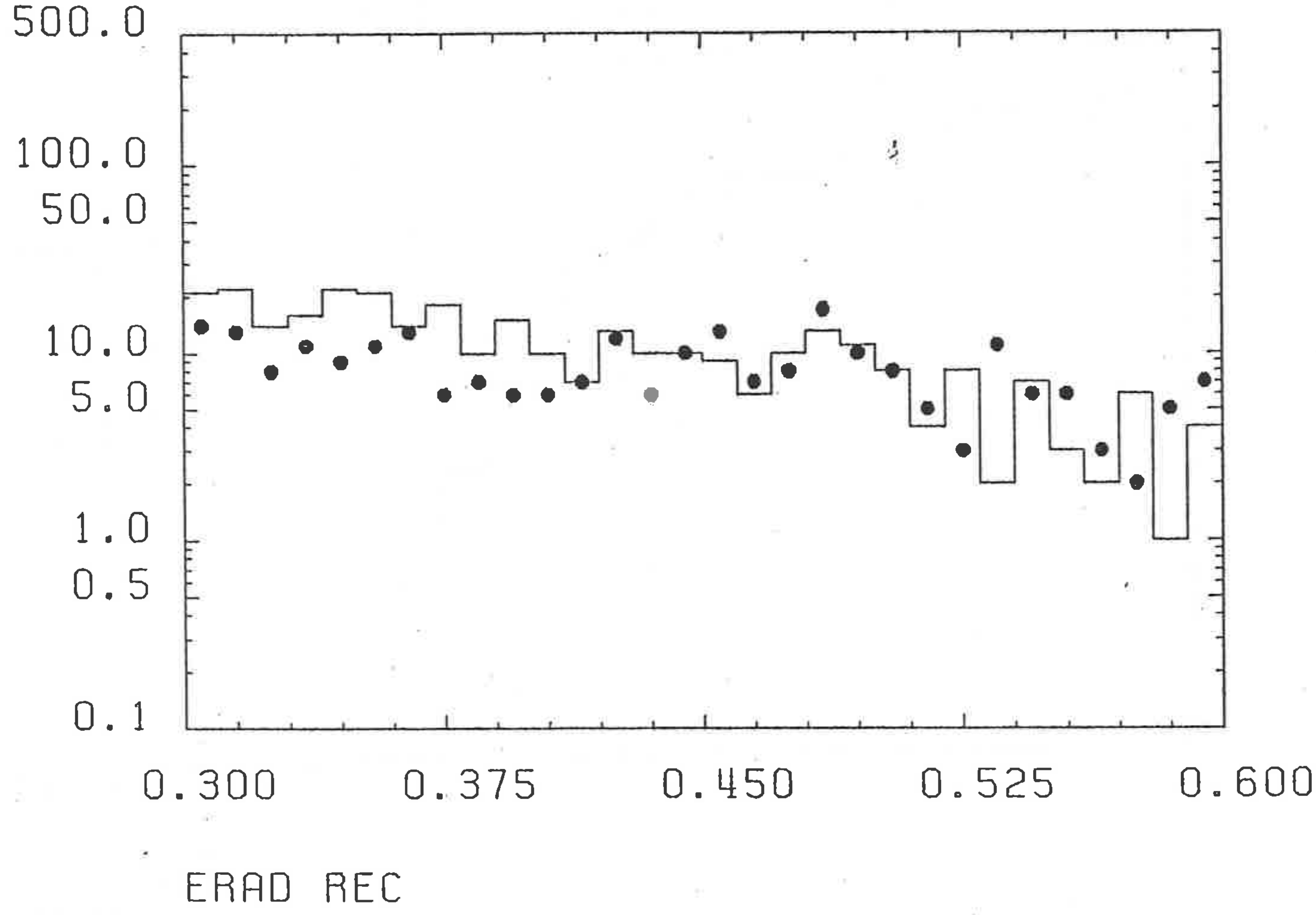


TWØ-JET TRACKED
ANGLE MC VS ERAD

START OF PAGE 1

7

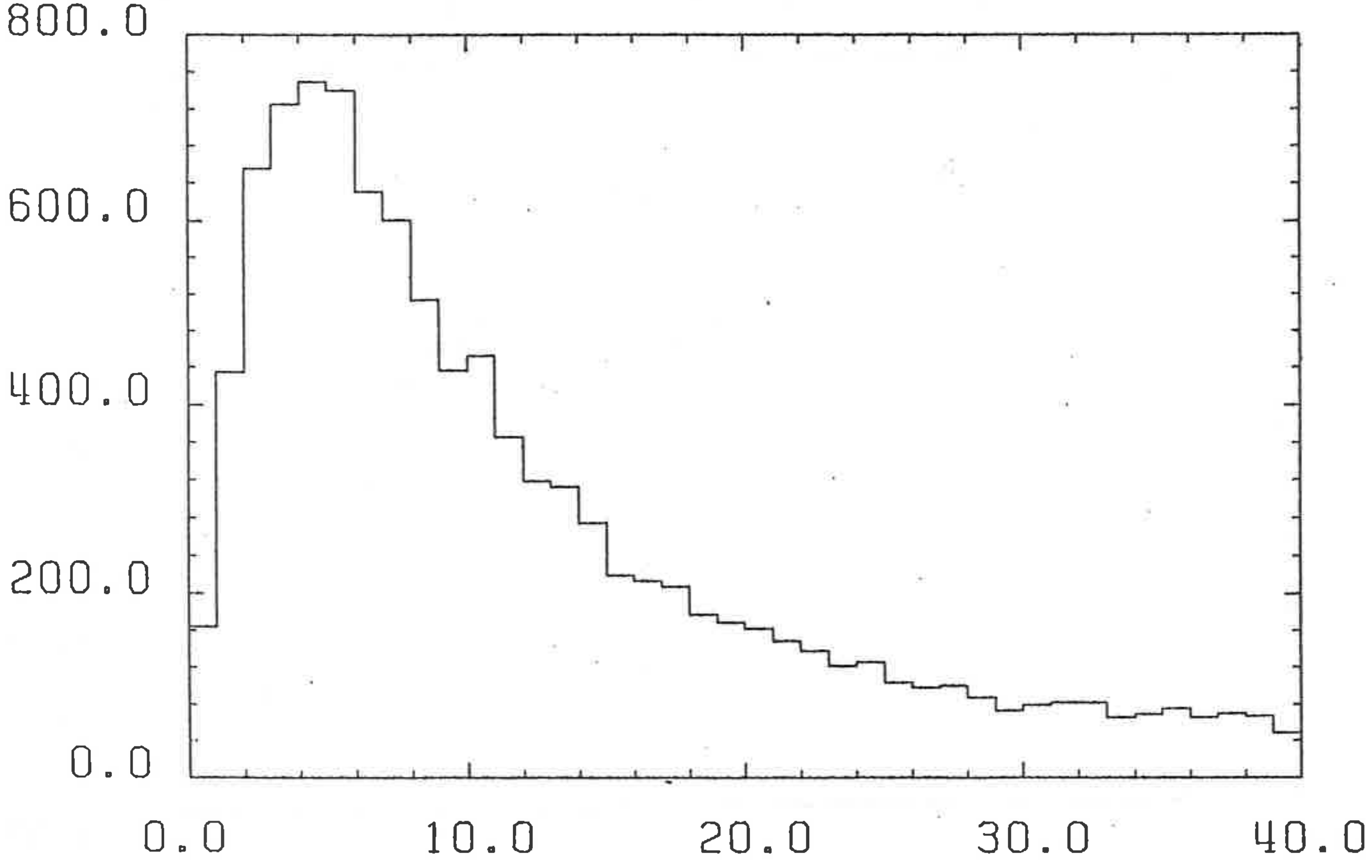
DSN=F11G0D.GEP.T2JTRK4V
12/03/81 KA 1 1
15.42.14 KB 176 689
KC 0 0
NSYM 10 -2



7

8(b)

DSN=F11G0D.GEP.T4J4V
05/03/81 KA 1
14.14.00 KB 20
KC 0
NSYM 10

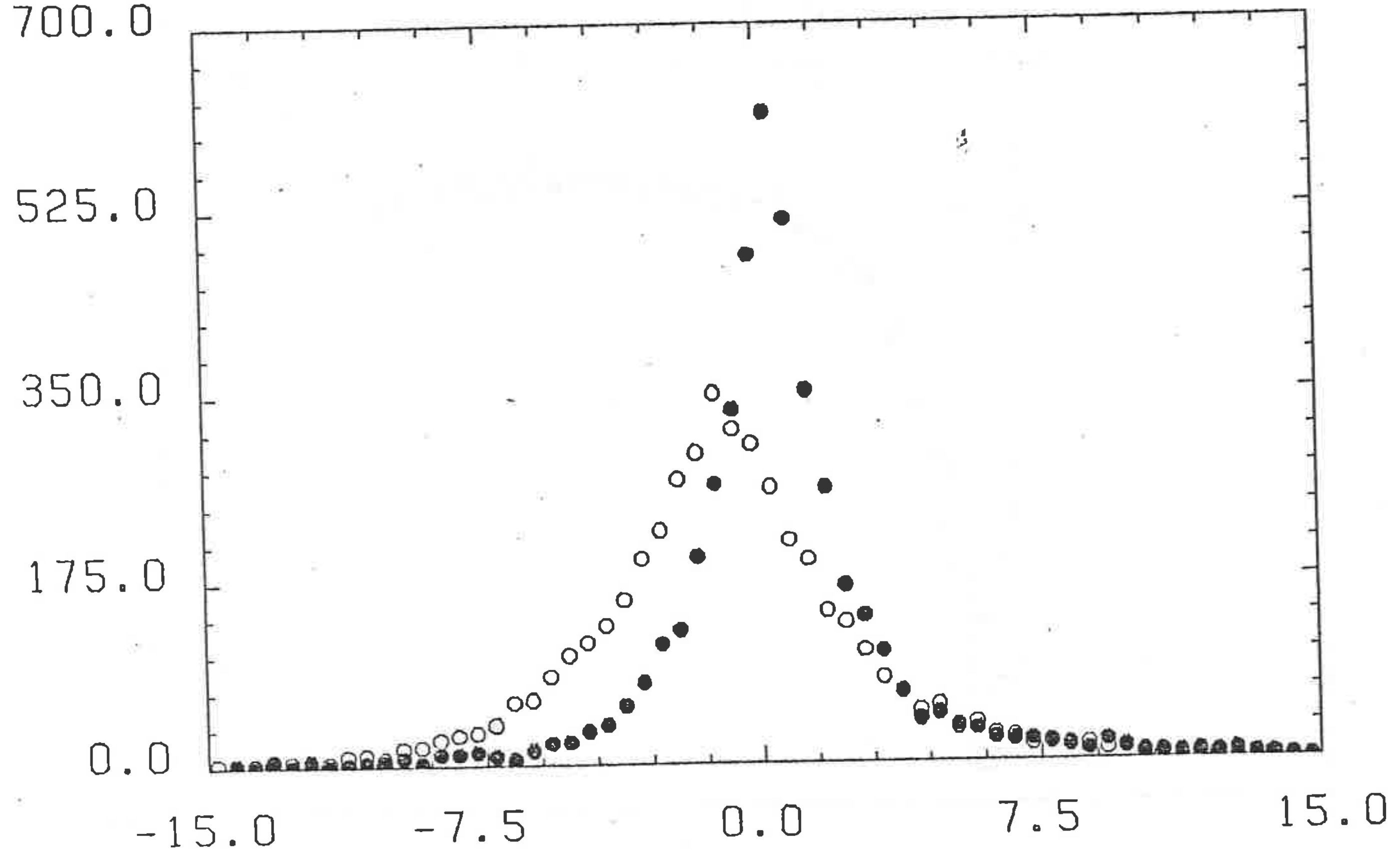


FØUR-JET 4V
ERRØR (WITH MATCHING)

8 (b)

END OF PAGE 1

N=F11G0D.GEP.T3JTRK
/05/81 KA 1 1
.13.05 KB 59 158
KC 0 0
NSYM -12 -2

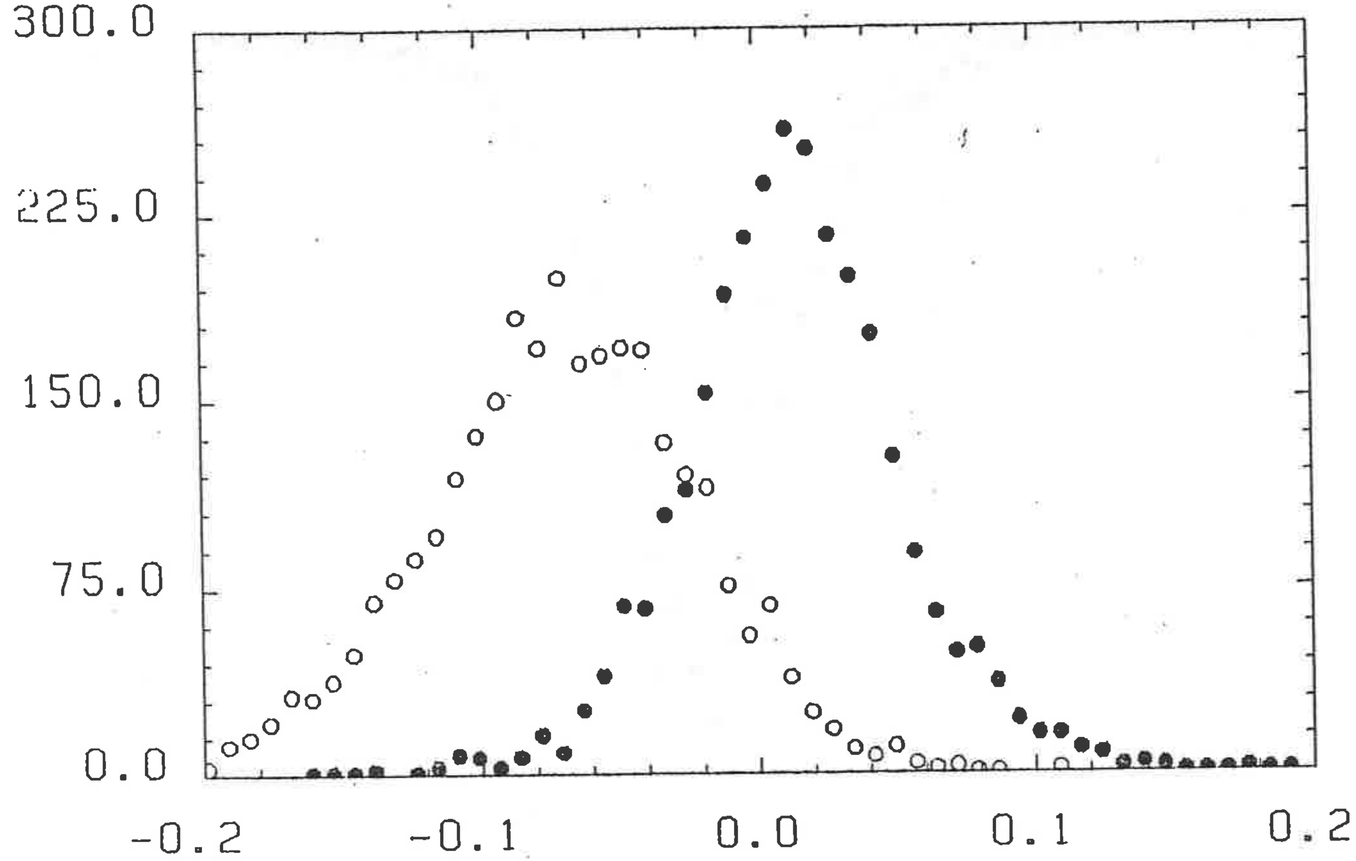


THREE-JET TRACKED
~~VIS JET E~~ EREC - PARE

10

12

DSN=F11G0D.GEP.T3J4V
05/03/81 KA 1 1
07.25.13 KB 287 288
KC 0 0
NSYM -12 -2

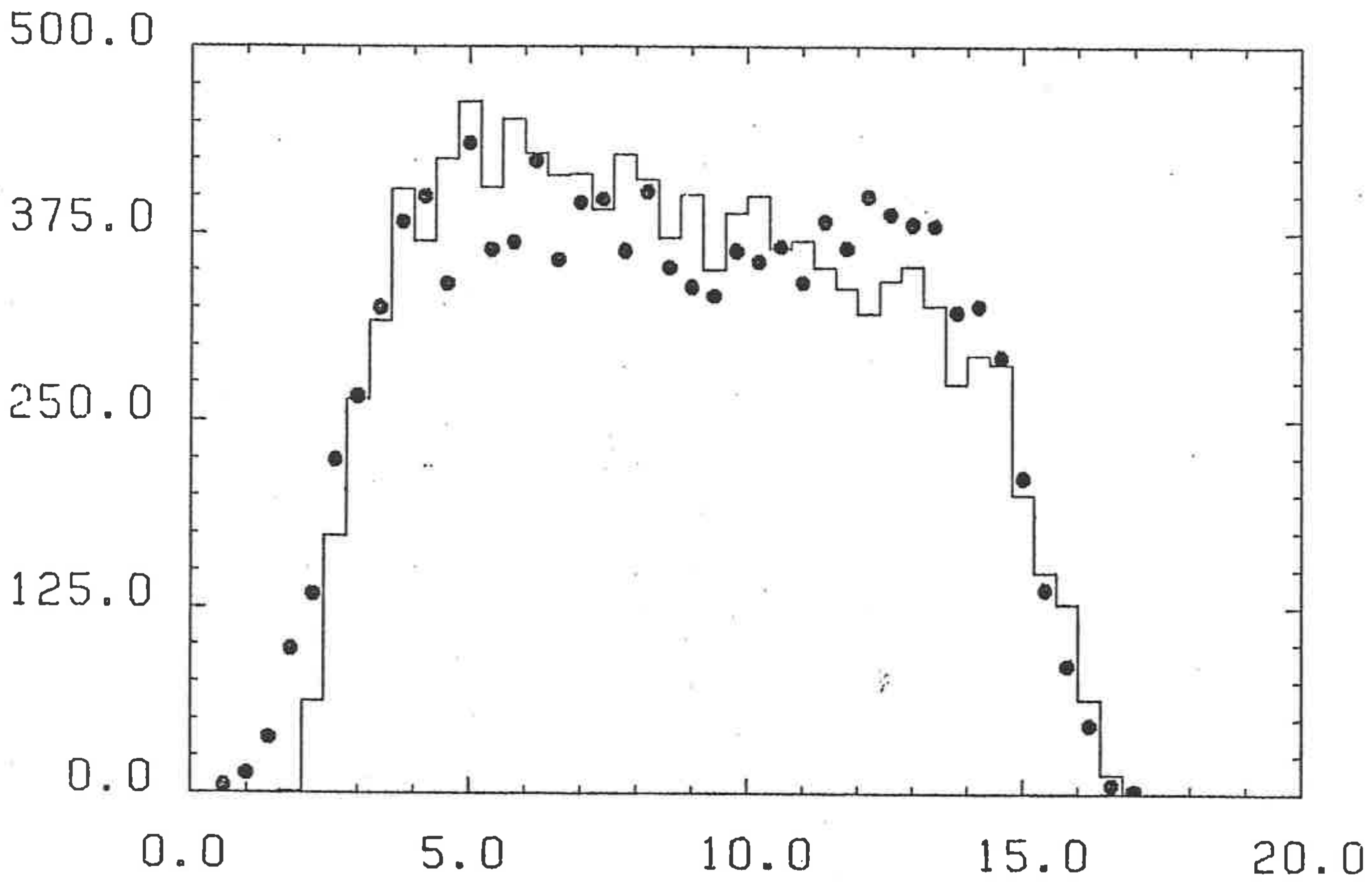


THREE-JET 4V
THRUST - THPAR

12

14

DSN=F11GOD.GEP.T4J4V
10/03/81 KA 1 1
17.06.22 KB 9 12
KC 0 0
NSYM 10 -2



FØUR-JET 4V
PARTØN E

Addendum to Computer-note 52

replacing " 22

A. Ball

27.10.81

```
F22ALL.JADEMUS(MUNEWS)                          DATE: 21/10/81 TIME: 17:37:20
C    04/05/81 110211734   MEMBER NAME   MUNEWS    (JADEMUS)      FORTRAN
              THIS MEMBER CONTAINS INFORMATION ABOUT DEVELOPMENT OF
              MUON CALIBRATION/SOFTWARE SINCE LAST ISSUE OF @MUINFOM
              ( I.E. JADE COMPUTER NOTE 22 ).
THE LAST ISSUE WAS ISSUE NO. 3 AND WAS ISSUED ON 10/04/81.
****************************************************************
***   ON 20/10/81 , A NEW VERSION OF THE MUON SOFTWARE WAS     ***
***   IMPLEMENTED .  SEE 'F22ALL.JADEMUS(MUINFOM)' & JADE      ***
***   COMPUTER NOTE 52 .                                       ***
***     THE MAIN CHANGES ARE AS FOLLOWS :                      ***
***   (A) THE MUON CHAMBER REGIONS ARE ARTIFICIALLY 'EXTENDED' ***
***       SO THAT, EVEN IF AN EXTRAPOLATED TRACK IS SUPPOSED   ***
***         TO (NARROWLY) MISS A CHAMBER REGION , THAT REGION IS ***
***         STILL SEARCHED FOR HITS WITHIN 3 SIGMA.            ***
***   (B) MANY CHANGES HAVE BEEN MADE TO THE GRAPHICS ROUTINES.***
***        THESE ARE EXPLAINED FULLY IN JADE COMPUTER NOTE 52. ***
***    A COMPLETE RE-ISSUE OF JADE COMPUTER NOTE 22 IS NOT     ***
***    BEING DONE NOW DUE TO THE POSSIBILITY OF FURTHER IMPRO- ***
***    VEMENTS IN THE NEAR FUTURE.                             ***
****************************************************************
```

```
      JADE COMPUTER NOTE 53
      =====================

      THIS IS JADEPR.TEXT(MSSNOTE)

      HOW TO USE THE JADE VOLUMES ON MSS
      (MSS = MASS STORAGE SYSTEM)
      ===================================
 ***                                         STATUS 25/01/82
                                             (P. STEFFEN)
      UPDATED:           (UPDATED LINES ARE MARKED WITH *** )

 1)   THE MSS IS ORGANIZED IN VOLUMES
      --->    EACH VOLUME   HAS   403 CYLINDERS OF 3330 DISK
      --->    EACH CYLINDER HAS    19 TRACKS    OF 3330 DISK
      --->    EACH TRACK    HAS 13030 BYTES     OF 3330 DISK
      EACH MSS VOLUME HAS 403 CYLINDERS = 7657 TRACKS (403*19)
      = ABOUT 100 MBYTES (403*19*13030 BYTES).
      THAT MEANS: EACH VOLUME HAS ABOUT THE CAPACITY OF A TAPE (DEN=4).

 ***  AT PRESENT(25 JANUARY 82) JADE HAS 16 VOLUMES = 120 000 TRACKS
      FOR PUBLIC USE.

 2)   MULTIVOLUME FILES ARE NOT POSSIBLE ON MSS.

 3)   TO USE (READ OR WRITE) A FILE WHICH IS ALREADY STORED ON MSS
      IS LIKE USING A FILE ON DISK.
      IN A BATCH JOB YOU SHOULD  N O T  USE THE 'UNIT' PARAMETER.
      EXAMPLE:
      //GO.FT01F001 DD DISP=SHR,DSN=...

 4)   TSO-ALLOCATION OF A NEW DATASET ON MSS IS POSSIBLE.
 ***  YOU HAVE TO SPECIFY:  MSVGP=VJAD OR VJA2

 5)** BEFORE ALLOCATING A DATA SET ON VJAD INFORM THE MSS COORDINATOR
      (P. STEFFEN) BY A  W R I T T E N  NOTE ABOUT PURPOSE, SIZE, USERS,
      AND APPROX. EXPIRING DATE OF YOUR DATA SET (SEE EXEMPLE BELOW).
 ***  THE USE OF VJA2 IS FREE TO ALL JADE MEMBERS. IN CASE OF MISUSE
 ***  OF THESE FREE VOLUMES, THIS RULE MUST BE RECONSIDERED.

 6)   TO ALLOCATE A NEW DATASET IN A BATCH JOB YOU HAVE TO SPECIFY
 ***  THE PARAMETERS 'UNIT=3330V' AND 'MSVGP=VJAD' OR 'MSVGP=VJA2'
      ( MSVGP = MASS STORAGE VOLUME GROUP, IN IBM-ENGLISH).
      FOR THE JADE VOLUMES, MSVGP=VJAD    .
      EXAMPLE 1:
      //GO.FT02F001 DD DSN=F11PST.TEST1,DISP=(NEW,CATLG),
      //                 DCB=R01DCB.VBS,
 ***  //                 UNIT=3330V,MSVGP=VJA2
      !!!!!!!!!!!!!!  THE LAST LINE IS NEW  !!!!!!!!!!!

      EXAMPLE 2: (NOTASK JOB JUST FOR ALLOCATION OF DATASET)

      // JOB  CLASS=E,MSGLEVEL=(1,1),TIME=(,01)
      //*  TO ALLOCATE SEQUENTIAL DATASET ON MSS
      //*MAIN ORG=EXT,LINES=2,RELPRI=MED
      // EXEC PGM=NOTASK,REGION=10K
      //A  DD DSN=F11PST.TEST1,DISP=(NEW,CATLG),
 ***  //   DCB=R01DCB.VBS,UNIT=3330V,MSVGP=VJA2


      YOU MUST NOT USE THE 'SPACE' PARAMETER.
      THE DEFAULT 'SPACE' PARAMETER WHICH IS USED AUTOMATICALLY
      IS CHOOSEN IN A WAY TO MAKE OPTIMAL USE OF THE VOLUME.
      THIS DEFAULT 'SPACE' PARAMETER ALLOCATES
      8 CYLINDERS AS PRIMARY AND AS SECONDARY ALLOCATION.
      SINCE 15 SECONDARY ALLOCATIONS (EXTENTIONS) ARE POSSIBLE,
      YOU GET UP TO 128 CYLINDERS = 2432 TRACKS = ABOUT 32 MBYTES.
      YOU CAN STORE ABOUT 2400 MULTI-HADRON EVENTS ON THIS SPACE.

 ***  STILL BIGGER DATASETS SHOULD REMAIN ON TAPE. EXCEPTIONS SHOULD
 ***  BE DISCUSSED WITH THE MSS COORDINATOR.
```



```
 7)    TSO COMMANDS LIKE:  DEL
                           LD
                           LDS
       ARE WORKING ALSO FOR MSS DATASETS.
       NOTE THAT LD AND LDS INVOLVE MOUNTING (!!)  OF THE MSS-VOLUME.
       THIS IS TIME CONSUMING . THEREFORE : PLEASE DO  LD AND LDS AS
       LITTLE AS POSSIBLE.

 8)    IT IS NOT RECOMMENDED TO COPY NEWLIB LIBRARIES (SOURCE OR LOAD)
       TO MSS, SINCE THE ACCESS WILL BE MUCH SLOWER.
       LIBRARIES, DIRECT ACCESS DATASETS, AND SMALL SEQUENTIAL DATASETS
       (UP TO 240 TRACKS OF 19090 BYTES EACH = ABOUT 4.6 MBYTES )
       SHOULD BE ALLOCATED ON 'FAST' DISKS.
       THE 'FAST' DISKS ARE CONTROLLED BY THE HSM SYSTEM.
       DATASETS ON 'FAST' DISKS WILL  N O T  BE MIGRATED TO TAPE ANYMORE.
       HSM WILL MAKE SURE THAT DATASETS ON 'FAST' DISKS ARE READILY
       ACCESSIBLE.
       YOU GET MORE INFORMATION ON HSM IF YOU TYPE:  H HSM

 9)    IN SUMMARY:
---->  INFORM MSS-COORDINATOR BY WRITTEN NOTE ABOUT YOUR DATA SET
 ***   B E F O R E  INSTALLATION ON VJAD.
 ***   THE USE OF VJA2 IS FREE TO ALL JADE MEMBERS.
---->  DON'T USE THE SPACE PARAMETER IN BATCH ALLOCATION.
---->  PUT LIBRARIES AND SHORTER DATASETS (< 240 TRACKS) ON 'FAST' DISKS,
       BUT NOT ON MSS.
---->  LARGER DATASETS (> 2432 TRACKS) SHOULD REMAIN ON TAPE,
       BUT NOT ON MSS.

 10)   MSS DATASETS NOT FITTING IN THE SCHEME DESCRIBED CAN BE REMOVED
       WITHOUT NOTICE BY THE MSS-COORDINATOR.

 11)   YOU GET MORE INFORMATION ON THE MASS STORAGE WITH NEWLIB
       COMMAND:  HELP MSS

 12)   IF YOU HAVE PROBLEMS WITH MSS, PLEASE CONTACT YOUR MSS-COORDINATOR
       PETER STEFFEN, (USER I.D.= F11PST/F11LHO ), PHONE= 3137

-------------------------------------------------------------------
   THERE ARE 16 TEMPORARY VOLUMES (CALLED "VTMP") AVAILABLE FOR PUBLIC
   USE BY EVERYBODY AT DESY.
   WE SHOULD MAKE USE OF THEM AS MUCH AS POSSIBLE.
*** DATASETS ON VTMP HAVE A LIFETIME OF 7 DAYS.
   THAT MEANS: ON A MONDAY (RIGHT AFTER DELETION OF OLD
   FILES,BY R1) YOU HAVE A GOOD CHANCE TO GET SOME SPACE.
   HERE IS THE JCL TO ALLOCATE SPACE ON VTMP'S IN A BATCH JOB:

     //F11PST   JOB CLASS=E,MSGLEVEL=(1,1),TIME=(,01)
     //*  TO ALLOCATE SEQUENTIAL DATASET ON MSS - VTMP
     //*MAIN ORG=EXT,LINES=2,RELPRI=MED
     // EXEC PGM=NOTASK,REGION=10K
     //A  DD DSN=F11PST.TEST2,DISP=(NEW,CATLG),
     //   DCB=R01DCB.VBS,UNIT=3330V,MSVGP=VTMP

======================================================================

EXEMPLE FOR NOTE:
F22MCC.MSS.MUONS80            SIZE:     800 TRACKS
                              CONTACT : F22MCC
                              CONTENTS: 200 MUHADS WITH INCL.MUONS(80)
                              USERS:    F22BOW,F22BAM,F22BAL,F22ALL,
                                        F22BAR,F22HAI
                              EXP.DATE: UNKNOWN

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