

14 R*4 RMS DEVIATION FOR 'GCCD' CLUSTER - SEE ALSO WORDS 25,26.
 =0. IF MULINA (AMBIGUITY RESOLVING ROUTINE) NOT CALLED.
 =-1. IF IT FAILS ACCEPTANCE CRITERIA,
 =-2. IF IT HAS MORE THAN 2 ACCEPTABLE AMBIGUITY
 PERMUTATIONS.
 =-9999. IF MULINA HAS TAKEN NO ACTION, E.G. IF ONLY 1
 LAYER, OR TOO MANY AMBIGUITIES, OR ONLY 2 LAYERS AND
 TOO MANY AMBIGUITIES.
 NOTE THAT IF THIS WORD.LE.0 THEN WORDS 6-11 CONTAIN THE
 THE RESULTS OF FITTING PRIOR TO CALL TO MULINA, I.E.
 L AND R HITS OF UNRESOLVED HITS USED WITH EQUAL WEIGHT
 (ALTHOUGH WITH LOWER WEIGHT THAN RESOLVED HITS).
 15 R*4 INTEGRAL DL (=DISTANCE, MM).) (FROM
 16 R*4 INTEGRAL DENSITY*DL (= MATERIAL TRAVERSED,) (INTER-
 GM CM**-2).) (ACTION
 17 R*4 INTEGRAL (-DE/CX)*DL (ENERGY LOSS, MINIMUM) (POINT TO
 IONISING PARTICLE, GEV).) (LAST
 18 R*4 INTEGRAL DL/(ABSORPTION LENGTH) ('NUMBER' OF) (POINT IN
 ABSORPTION LENGTHS) ASSUMING A PION.) (CLUSTER.
 19 R*4 MU 'GOODNESS' PARAMETER (VERY CRUDE AT THIS STAGE).
 20 R*4 HADRON 'LEAK' PROBABILITY, EXP(-(NO. OF AESN. LENGTHS)).
 21 I*4 ASSOCIATED INNER DETECTOR TRACK NO., IF ANY.
 22 I*4 ASSOCIATED LEAD GLASS CLUSTER NO., IF ANY.
 23 R*4 DISTANCE BETWEEN PROJECTIONS OF THE MU-TRACK AND THE
 INNER DETECTOR TRACK, IF ANY, AT THE POSITION OF THE
 FLUX RETURN YCKE.
 24 R*4 ULTIMATE RANGE OF A MUON WITH MOMENTUM OF INNER DETECTOR
 TRACK, IF ANY (GM CM**-2).
 25 R*4 RMS DRIFT DIRECTION DEVIATION.) IGNORE IF
 26 R*4 RMS LONGITUDINAL (WIRE) DIRECTION DEVIATION.) WD 14.LE.0.
 27 I*4 CLUSTER NUMBER.

MUR1 BANK 4 - THE POINTER LIST HCLP.

HCLP(ICL) POINTS TO START OF INFORMATION IN HCLIST (BANK 5) FOR
 CLUSTER ICL.

HCLP(NC. OF CLUSTERS +1) POINTS TO WORD AFTER THE LAST.

MUR1 BANK 5 - THE HIT LIST HCLIST.

THIS GIVES THE HITS BELONGING TO EACH CLUSTER.

BANKS 4 AND 5 MAY BE USED IN CONJUNCTION TO FIND THE HITS BELONGING

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    TO EACH CLUSTER AS FOLLOWS...
    NCLS = NO. OF CLUSTERS (WORD 2 OF BANK 0).
    NWHIT = NO. OF WORDS PER HIT (WORD 3 OF BANK 0).
    NWCL = NO. OF WORDS PER CLUSTER (WORD 4 OF BANK 0).
    IPCL = IP3, WHERE IP3 IS POINTER TO BANK 3.
    IP11 = 2*IP1, WHERE IP1 IS POINTER TO BANK 1.
    IP44 = 2*IP4, WHERE IP4 IS POINTER TO BANK 4.
    IP55 = 2*IP5, WHERE IP5 IS POINTER TO BANK 5.
BEGIN LOOP 1 - LOOP OVER CLUSTERS          ***** START LOOP 1
    DO 1000 ICL=1,NCLS
    FIND HITS FOR THIS CLUSTER. TO GET HITS OF SECONDARY CLUSTER USE
    THE POINTERS OF PRIMARY CLUSTER.
        JCL=ICL
        IALT=IDATA(IPCL+4)
        IF(IALT.NE.0.AND.IALT.LT.ICL)JCL=IALT
        LP=HDATA(IP44+JCL)
        LPNEXT=HDATA(IP44+JCL+1)
    START LOOP 2.                          ***** START LOOP 2.
2000 CONTINUE
        IHIT=HDATA(IP55+LP)
        IP=NWHIT*(IHIT-1)
    NOW YOU CAN FIND HITS. ADD IP TO IP11 TO GET START OF COORDINATE DATA.
    (DON'T FORGET TO USE APPROPRIATE INFORMATION, E.G. AMBIGUITY FLAGS,
    FOR SECONDARY CLUSTERS, I.E. IF(JCL.LT.ICL)).
        ....
        ....
    END LOOP 2.                            ***** END LOOP 2.
2001 CONTINUE
        LP=LP+1
        IF(LP.LT.LPNEXT)GO TO 2000
    END LOOP 1.                            ***** END LOOP 1.
1001 CONTINUE
        IPCL=IPCL+NWCL
1000 CONTINUE

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MUON RESULTS BANKS 'MUR2' (4 BANKS NUMBERED 0-3).

THESE BANKS REPRESENT THE RESULTS OF FOLLOWING 'PHILOSOPHY 2', I.E.
OF FOLLOWING INNER DETECTOR TRACKS OUT.

'MUR2' BANK 0 - GENERAL INFORMATION.

WORD	TYPE	CONTENTS
1	I*4	NO. OF INNER DETECTOR TRACKS ACCORDING TO BANK 'PATR'.
2	I*4	NO. OF 4-BYTE WORDS PER TRACK IN BANK 1.
3	I*4	NTPH, NO. OF TRACKS PER HIT ALLOCATED IN BANKS 2 AND 3.

'MUR2' BANK 1 - MUON INFORMATION FOR EACH INNER DETECTOR TRACK. (IN
THE FOLLOWING DESCRIPTION, 'MULTIPLE SCATTERING CIRCLE' MEANS AN
ELLIPSE IN THE PLANE OF A MUON CHAMBER WITH MAJOR AXIS PARALLEL
TO THE WIRE. THE SEMI-MAJOR/MINOR AXIS HAS A LENGTH DMAJOR/DMINOR.
DMAJOR=F*SDL,
DMINOR=F*SDD,
WHERE

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12 R*4 INTEGRAL DL (=DISTANCE, MM). )(FROM
13 R*4 INTEGRAL DENSITY*DL (= MATERIAL TRAVERSED, )(VERTEX
    GM CM**-2). )(TO
14 R*4 INTEGRAL (-DE/DX)*DL (ENERGY LOSS, ASSUMING )(LAST
    PARTICLE IS A MUON, GEV). )(HIT.
15 R*4 INTEGRAL DL/(ABSORPTION LENGTH) ('NUMBER' OF )(
    ABSORPTION LENGTHS) ASSUMING A PION. )(
16 R*4 ENERGY AT LAST HIT ASSUMING MUON (GEV).
17 R*4 INTEGRAL DL (=DISTANCE, MM). )(FROM
18 R*4 INTEGRAL DENSITY*DL (= MATERIAL TRAVERSED, )(VERTEX TO
    GM CM**-2). )(POSSIBLE
19 R*4 INTEGRAL (-DE/DX)*DL (ENERGY LOSS, ASSUMING )(FURTHER
    PARTICLE IS A MUON, GEV). )(HIT. SAME
20 R*4 INTEGRAL DL/(ABSORPTION LENGTH) ('NUMBER' OF )(AS 12-15
    ABSORPTION LENGTHS) ASSUMING A PION. )(IF NONE.
? 21 R*4 PROBABILITY OF PI->MU DECAY.
? 22 R*4 PROBABILITY OF NO NUCLEAR INTERACTION, ASSUMING A PION.
? (THIS IS JUST EXP(-WORD 20).)
? 23 R*4 PROBABILITY OF PION PUNCHTHROUGH.
? 24 R*4 PROBABILITY OF K->MU DECAY.
? 25 R*4 PROBABILITY OF BEING A MUON.
? IF CLEAN (WORD 6.LT.10), = CHI-SQUARED PROB. (WORD 11),
? IF STOPS SHORT (WORD 6.GT.10 AND .LT.100), MULTIPLY
? BY INEFFICIENCY OF POSSIBLE FURTHER
? CHAMBER FIRING.
? IF DIRTY (MCD(WORD 6,10).EQ.3), MULTIPLY BY A FACTOR
? .LT.1. BECAUSE IT MAY BE A NUCLEAR INTERACTION.
? 26 R*4 PROBABILITY OF BEING A HADRON.
? = SUM OF WORDS 22 AND 23, PLUS THE DECAY
? PROBABILITIES (WORDS 21 OR 24) WEIGHTED IN SOME WAY
? ACCORDING TO THE RELATIVE PROBABILITIES DEDUCED
? FROM TIME OF FLIGHT OR DE/DX MEASUREMENT.
? IF DIRTY, MULTIPLY BY A FACTOR .GT.1. BECAUSE IT MAY
? BE A NUCLEAR INTERACTION.
? 27 I*4 CLUSTER NUMBER OF ASSOCIATED MUON CLUSTER RECORDED IN
? MUON RESULTS BANKS 'MUR1'. (=1 IF MORE THAN 1 CLUSTERS
? ARE ASSOCIATED. IN THIS CASE SEE 'MUR2' BANK 2 AND
? 'MUR1' BANK 2.)
? 28 I*4 NO. OF HITS EXTRA TO ASSOCIATED CLUSTER.)(=0 FOR
? 29 I*4 NO. OF HITS IN ASSOCIATED CLUSTER BUT )(COMPLETE
? NOT FOUND HERE. )(CORRESPONDENCE.

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MUR2 BANK 2 - MUON HIT - INNER DETECTOR TRACK CORRELATION.
 NTPH I*2 WORDS PER HIT. (NTPH IS THE NUMBER OF TRACKS PER HIT
 ALLOCATED IN THIS BANK, AND IS GIVEN IN WORD 3 OF BANK 0.)

FOR EACH MUON HIT....

WORD TYPE CONTENTS

1 I*2 1ST INNER DETECTOR TRACK NUMBER (=0 IF NONE).

2 I*2 2ND INNER DETECTOR TRACK NUMBER (=0 IF NONE).

NTPH I*2 NTPH*TH INNER DETECTOR TRACK NUMBER (=0 IF NONE,
 = -(TRACK NUMBER) IF MORE THAN NTPH TRACKS
 ASSOCIATED WITH THIS HIT).

MUR2 BANK 3 - MUON HIT AMBIGUITY FLAGS. FOR EACH ENTRY IN BANK 2
 THERE IS AN ENTRY HERE. THE AMBIGUITY FLAG IS...
 -1, LEFT AMBIGUITY SELECTED,
 +1, RIGHT AMBIGUITY SELECTED,
 0, BOTH AMBIGUITIES EQUALLY ACCEPTABLE.

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END OF BANK DESCRIPTIONS. -----

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IFRAME FRAME NUMBER.
 ICHAM CHAMBER NUMBER.
 NFRAMS NUMBER OF FRAMES.
 NCHAMS NUMBER OF CHAMBERS.

FIXED DATA FOR EACH FRAME....

HFACE(IFRAME) 1-6 FOR -X,+X,-Y,+Y,-Z,+Z RESPECTIVELY.
 =0 IF FRAME NOT PRESENT.
 HSECT(IFRAME) SECTION NUMBER OF SECTION TO WHICH FRAME BELONGS
 HLAYR(IFRAME) 1-5 NUMBERING FROM THE INTERACTION POINT OUTWARD
 =1, INSIDE RETURN YOKE
 =2-5 FOR LAYERS ON CONCRETE,
 HNORM(IFRAME) =1, NORMAL OF PLANE PARALLEL TO X-AXIS
 =2, NORMAL OF PLANE PARALLEL TO Y-AXIS
 =3, NORMAL OF PLANE PARALLEL TO Z-AXIS
 HLONG(IFRAME) =1, WIRE NOMINALLY PARALLEL TO X-AXIS
 =2, WIRE NOMINALLY PARALLEL TO Y-AXIS
 =3, WIRE NOMINALLY PARALLEL TO Z-AXIS
 FTRANS(IFRAME) =1, DRIFT FIELD PARALLEL TO X-AXIS
 =2, DRIFT FIELD PARALLEL TO Y-AXIS
 =3, DRIFT FIELD PARALLEL TO Z-AXIS
 HAC(IFRAME) CHAMBER NUMBER OF FIRST CHAMBER IN FRAME.
 HAL(IFRAME) CHAMBER NUMBER OF LAST CHAMBER IN FRAME.
 HUNIT(IFRAME) UNIT TO WHICH THIS FRAME BELONGS.

SURVEY DATA FOR EACH FRAME....

HDIST(IFRAME) THE COORDINATE OF THE CENTRAL PLANE WHERE THE AXIS
 SPECIFIED BY HNORM(IFRAME) CUTS THE PLANE. (UNITS MM)
 HANG(IFRAME) THE ANGLE BETWEEN THE WIRE AND THE AXIS SPECIFIED BY
 HLONG(IFRAME) (UNITS 1/10 MR)
 HCLLO(IFRAME) LOWER LONGITUDINAL COORDINATE LIMIT
 HCLHI(IFRAME) UPPER LONGITUDINAL COORDINATE LIMIT
 HCTLO(IFRAME) LOWER TRANSVERSE COORDINATE LIMIT
 HCTHI(IFRAME) UPPER TRANSVERSE COORDINATE LIMIT
 THE ABOVE 4 VARIABLES APPLY TO TOTAL SENSITIVE AREA
 OF PLANE. THEY ARE IN MM

FIXED DATA FOR EACH WIRE....

HFR(ICHAM) FRAME NUMBER FOR THIS CHAMBER.

SURVEY DATA FOR EACH WIRE....

HDI(ICHAM) AMOUNT TO BE ADDED TO HDIST(IFRAME) TO GET TO
 COORDINATE OF THE CHAMBER. (UNITS MM)
 HCTW(ICHAM) TRANSVERSE COORDINATE OF EACH WIRE. (UNITS MM)

ELECTRONIC DATA FOR CHAMBERS...

HDTP(ICHAM) DRIFT TIME PEDESTAL (TRANS. CLOCK UNITS, CA. 60 NS.)
 HLTP(ICHAM) LONGITUDINAL TIME PEDESTAL (IN LONG. CLOCK UNITS,
 CA. 0.5 NS. OR 50 MM.)
 HLSF(J, ICHAM) LONG. SCALE FACTOR FOR J'TH HIT
 (UNITS (1/100MM)/LONG. CLOCK UNIT)
 HVDRFT(ICHAM) DRIFT VELOCITY (MICRONS PER CLOCK UNIT (50 NS)).

THE ABOVE DATA ARE USED TO CONVERT SIGNALS TO COOR-

MACRO CMUFIL.

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INTEGER*2 HBLLO(6),FBLHI(6),HBTLO(6),HBTHI(6),HBNLIM(36)
INTEGER*4 IFCIND(6)
INTEGER*2 HFILDA
COMMON/CMUFIL/HFILDA(72)
EQUIVALENCE (HBLLO(1),HFILDA(1)),(HBLHI(1),HFILDA(7)),
*           (HBTLO(1),HFILDA(13)),(HBTHI(1),HFILDA(19)),
*           (HBNLIM(1),HFILDA(25)),(IFCIND(1),HFILDA(61))

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MACRO CMUYOK.

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INTEGER*2 HYKTDm,HYKLDM,HYKNMI,HYKNMO
COMMON/CMUYOK/HYKNMI(4),HYKNMO(4),HYKLDM(4),HYKTDm(4),BYOKE,
*           IYKIND

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MACRO CMUENP.

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COMMON/CMUENP/IZEI1,IZEI0,IREP1,IREP2,IREP3,IREP4,IXYEF5,
*           IZOEP1,IZOEP2,IZOEP3,IZOEP4,IZOEP5,CAEP2,
*           IEPIND,IEPSCT

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END OF COMMON DESCRIPTIONS.