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==== UPDATE ==== THIS NOTE REPLACES OLD JADE C.N. 74==========

JADE COMPUTER NOTE NUMBER 74

SUBJECT: Analysis Routines for Tagging System

Author:A.J.Finch

THIS NOTE CAN BE FOUND IN 'F11LHO.TAGG.S(TAGNOTE2)'

Summary:

This note desribes briefly the analysis routines installed recently on F11LHO.TAGG.S and F11LHO.TAGG.L whose purpose is to produce the output banks 'ACLS', 'TAGG' /0,/1,/2 whose content is described in Jade Computer Note No.16.The input to these routines is the 'ATAG' bank which contains the raw adc contents from the tagging adcs.They also utilise a new set of calibration constants installed on the standard Jade calibration file,and obtained in the usual way by calling KALIBR for every run.The programs were originally written by H.Wriedt ,A.Finch, and J.Nye.

Introduction:

One part of JADE that has undergone slightly more changes than most is the tagging system . In 1979 and 1980 there was the Mark 1 . For 1981 with the arrival of mini - betas Mark 2 was installed suspended on the muon chambers. In order to solve the problems of browning lead glass encountered with this location, Mark 3 was installed for 1983 running onwards . All these systems require different software to analyse them due to their differing geometries etc.

The Software:

The minimum information a user needs to use the package that runs these analysis programs is:

1) Have F11LHO.TAGG.L in his list of load libraries.
2) CALL KALIBR for every run.
3) CALL TAGAN once per event.

4) For 1979/80 data only :
He must also have the private calibration file 'F22HOW.PEDESTAL.ALLSP80' attached to fortran stream 19.

The routine TAGAN

==========

TAGAN(IERTAG,NRUN)

Arguments:

IERTAG - OUTPUT RETURN CODE

NRUN - INPUT DUMMY RUN NUMBER TO OVERIDE CONTROL OF WHICH ANALYSIS ROUTINE IS CALLED FOR MONTE CARLO DATA

+ IN 99% OF CASES THIS CAN AND SHOULD BE SET TO ZERO +

Description:

This routine controls the analysis routines. Its first job is to check that the input event can be analysed. Classes of events that can not be analysed are :
a) Pedestal events.
b) Events with no 'HEAD' bank.
c) Events with no 'ATAG' bank.
The routine must then decide which of the three possible sets of routines to call (one for each version of the tagging sytem). It does this by using the information in the HEAD bank. For real data it simply uses the run number. For Monte Carlo events it is neccesary to tell the program which Mark of tagging system to expect this is done by one of two methods:-
On encountering Monte Carlo data, the routine looks at the input argument 'nrun' . If this number is not zero it takes, and uses, it as the run number, so -

Use of NRUN:

NRUN	ASSUMED SIMULATION
<6000	Mark 1
6000> <12947	Mark 2
>12948	Mark 3

If nrun is set to zero there is a second line of attack which is to look at the 2nd half word of the bank 'ATAG'. The value of this determines which simulation was done according to following scheme.

Value of word	Simulation
0	Mark 1 (or real data !)
1	Mark 2
2	Mark 3

(Provided this scheme has been adopted in the simulation then NRUN can be set to zero)

N.B. Tagan issues a messsage the first time it is called saying what it thinks it is analysing, and again if it encounters a change from one tagger type to another.

Meaning of return code 'IERTAG':

Value of IERTAG	Meaning
0	No Problems - and clusters found.
1	No Problems - but no clusters found ('ATAG',and 'HEAD' exist)
2	Analysis was completed but at least one of the output banks could not be created due to lack of space.
10	No 'ATAG' banks - no analysis done
11	No 'HEAD' bank - no analysis done

Stucture of the main anlysis routines:

The routines that TAGAN calls are-

ANATAG for 1979/80 data
TAGGTP for 1981 onwards data (with a flag to tell whether data is from 1981/2 or 1983 onwards)

The structure of TAGGTP is briefly described at the end of this note for anyone who is interested, for more detail refer to the commented version on F11LHO.TAGG.S.

Using analysis routines for other purposes:

Users may wish to use a small sample of the routines for their own purposes. E.g. for fast selection routines. It is possible for 1981 data onwards to use the following sheme:

```
      DATA THRESH/6000.0/

      CALL TAGSET(IMARK) - Force analysis to assume IMARK tagger,
                           IMARK = 2 or 3. - optional for monte
                           carlo data if simulation didn't set flag
                           in 'ATAG

      CALL TAGINT(&100)  - Initialisation - to be called once per
                           event ; RETURN 1 if can't work out which
                           tagger this is ( due to no head bank).

      CALL TAGADC(IWRITE,&100)    - Gets the ATAG data,if IWRITE=
                                    1 writes out some debugging info
                                    Applies nominal calibration to
                                    convert channel number to MeV.

      CALL TAGPED   - pedestal fixing - optional
                                    (no disaster if not done)
```



```
      CALL TAGKAL(IWRITE)     -   Calibration - optional
                                    (no disaster if not done)

      CALL TAGSUM(-1,SUMM,&100) - work out sum of -z and + z
      CALL TAGSUM(+1,SUMP,&100) - return 1 if sum has 'impossible'
                                                  value
C
C SUMM,SUMP,THRESH are in MeV
C
      IF((SUMM.GT.THRESH).OR.(SUMP.GT.THRESH))....
100   CONTINUE
```

> For more detailed information about these and other routines in this package see 'F11LHO.TAGG.S(#TAGDOC)'

For completeness there now follows a brief description of the procedure adopted in the routine 'TAGGTP' for analysing all data from 1981 onwards.

PROCESS	ROUTINE NAME (if not done in TAGGTP)	NOTES
Initialisation	TAGINT	
Read data in 'ATAG'	TAGADC	1) An overall calibration that converts adc channel number to MeV is applied. 2) Software addresses are used from here on.
Subtract pedestals	TAGPED	These are caused by fluctuating pedestals due to 50HZ AC pickup on signal cables.It is only treated in those events where it exceeds the cut off at 20 channels applied by the Le Croy ADC controler.Ammount to be subtracted is estimated on an event by event basis.
Apply calibration factors.	TAGKAL	Factors obtained from Kalibr.
Work out the sum of energy in -Z and +Z tagger.	TAGSUM(JPART,SUM)	Works out SUM for JPART end (JPART = +/- 1)
LOOP1 <This section once for -Z then once for +Z>>>>>>>>>>>>>>>		
Sort adcs into order of decreasing energy contents.	TAGSR1	

Use sorted list to find clusters of deposited energy. Store results in cluster map.	TAGCLS	

PROCESS	ROUTINE NAME (if not done in TAGGTP)	NOTES
LOOP2 <start loop over all clusters		(this end) >>>
Fill the cluster map 'ACLS' + save pointers for TAGG1		
Find position of centre of each cluster, in face of blocks.	TAGPOS	This is the main routine where geometrical differences effect the software. The procedure adopted compares the ratio of energies in the hit block and its neighbours to known distributions of energy within e/m showers to estimate how far to move the centre of the shower from the centre of the block with the largest ammount of energy, towards its neighbours with the next largest ammounts of energy N.B. A large fraction of hits lose some significant fraction of their energy out of the inner or outer edges, which makes position determination difficult. (Hardware addresses are used in the output)
Save information on individual clusters to put in TAGG/2		
<end of LOOP2 over each cluster>		
repeat LOOP1 for +Z		
Calculate angle between clusters found above. Flag colinear pairs of clusters in TAGG2		
Create output banks	TAGSTO	
Return to TAGAN		

F11LHO.TAGG.S(TAGNOTE2) DATE: 13/03/87 TIME: 12:42:11

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           CALL TAGSUM(-1,SUMM,&100) - work out sum of -z and + z
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 ! For more detailed information about these and other routines
 ! in this package see 'F11LHO.TAGG.S(#TAGDOC)'
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Work out the sum of energy in −Z and +Z tagger.	TAGSUM(JPART,SUM)	Works out SUM for JPART end (JPART = +/− 1)
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Save information on individual clusters to put in TAGG/2		
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repeat LOOP1 for +Z		
Calculate angle between clusters found above.Flag colinear pairs of clusters in TAGG2		
Create output banks	TAGSTO	
Return to TAGAN		

Software Information Note 8/2/84

A new version of the JADE Monte Carlo Tracking Program MCJADE has now been released. It features the Meier Lead Glass Shower Simulation (optional), K_L^0 and neutron tracking and improved multiple scattering of charged tracks.

The routines can be found on:

F22ELS:JMC.S/L

The old routines still exist on:

F22ELS.JMC.OLD.S/L

Standard JCL members exist as follows:

#MCJADE standard tracking without muon tracking
#PRODUCT as #MCJADE but with tape copy step
#PRODMU as #PRODUCT but includes muon tracking