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

JADE COMPUTER NOTE NUMBER 74

SUBJECT: Analysis Routines for Tagging System

Author: A.J. Finch

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

Summary:

This note desribes briefly the analysis routines installed recently on FilthO.TAGG.S and FILTHO.TAGG.L whose purpose is to produce the output banks 'ACLS', 'TAGG' (0,1,1,2 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 F1LHO.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

Page 2 WHICH + IN 99% OF CASES THIS CAN AND SHOULD BE + SET TO ZERO FOR MONTE - INPUT DUMMY RUN NUMBER TO OVERIDE CONTROL ANALYSIS ROUTINE IS CALLED FOR MO tagnote2.txt IERTAG - OUTPUT RETURN CODE DATA TAGAN (IERTAG, NRUN) Dec 18 1997 15:10:05 NRUN Arguments:

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 'AFBA' bank.
c) Events with no 'AFBA' 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 HFBAD bank. For real data it simply uses the run number. For Monte Carlo events it is necessary 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 imput argument 'nrum'. If this number is not zero it takes, and uses, it as the run number, so

Use of NRUN:

ASSUMED SIMULATION Mark 1 Mark 2 Mark 3 <12947 0009> NRUN <0009

>12948

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.

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

(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.



tagnote2.txt

Page 3		formed formal.	no clusters 'HEAD' exist)	the output be created due	analysis done	- no analysis done			tell whether data or 1983 onwards)	end of this efer to the		their own e for 1981		IMARK tagger, al for monte .idn't set flag	ed once per rk out which ead bank).	,if IMRITE= bugging info ibration to er to MeV.	
tagnote2.txt		Meaning Meaning of City	- but , and '	Analysis was completed but at least one of the output banks could not be created to lack of space.	No 'ATAG' banks - no analysis done	No 'HEAD' bank - no	nes:	.s are-	data (with a flag to tell w is from 1981/2 or 198	oriefly described at the ested, for more detail r	other purposes:	small sample of the routines for their selection routines. It is possible for following sheme:		ce analysis to assume RK = 2 or 3 option 10 data if simulation d	Initialisation - to be called once event; RETURN 1 if can't work out tagger this is (due to no head bank)	- Gets the ATAG data,if IWRITE- 1 writes out some debugging info Applies nominal calibration to convert channel number to MeV.	
Dec 18 1997 15:10:05	11.	Value of LEKIAG) rl	2	10	11	Stucture of the main anlysis routines:	The routines that TAGAN calls	ANATAG for 1979/80 data TAGGTP for 1981 onwards data	The structure of TAGGTP is briefly described at the end of note for anyone who is interested, for more detail refer to commented version on F11LHO.TAGG.S.	Using analysis routines for other purposes:	Users may wish to use a small samp purposes. E.g. for fast selection data onwards to use the following	DATA THRESH/6000.0/	CALL TAGSET(IMARK) - Force IMARK carlo	CALL TAGINT(£100) - Ini even tagg	CALL TAGADC(IWRITE, £100)	

Dec 18 1997 15:10:05		tagnote2.txt Page 4
CALL TAGKA	TAGKAL (IWRITE) -	Calibration - optional (no disaster if not done)
CALL	TAGSUM(-1,SUMM,&100) - TAGSUM(+1,SUMP,&100) -	- work out sum of -z and + z - return 1 if sum has 'impossible' value
C SUMM, SUMP, THRESH are	e in MeV	
100 CONTINUE	T.THRESH).OR.(SUN	IF((SUMM.GT.THRESH).OR.(SUMP.GT.THRESH))
For more detailed in in this package see	information about these and ee 'FiliHO.TAGG.S(#TAGDOC)'	these and other routines #TAGDOC)'
For completeness the the procedure adopts all data from 1981 c	ere now follows a sd in the routine onwards.	completeness there now follows a brief description of procedure adopted in the routine 'TAGGTP' for analysing data from 1981 onwards.
		化电子电阻 医阿斯里氏 医皮肤红斑 化二甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲甲
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(JPARI,SUM) Works	Works out SUM for JPART end (JPART = +/- 1)
LOOP1 <this section<="" td=""><td>once for -Z then</td><td>once for +Z>>>>>>>>></td></this>	once for -Z then	once for +Z>>>>>>>>>
Sort adcs into order of decreasing energy contents.	TAGSR1	



tagnote2.txt Page 5		NOTES	this end) >>>		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 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	(Hardware addresses are used in the output)						15 15 15 15 15 15 15 15 15 15 15 15 15 1
	TAGCLS	ROUTINE NAME (if not done in TAGGTP)	over all clusters		TAGPOS			each cluster>			TAGSTO		12 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)
Dec 18 1997 15:10:05	Use sorted list to find clusters of deposited energy. Store results in cluster map.	PROCESS	loop	Fill the cluster map 'ACLS' + save pointers for TAGG1	Find position of centre of each cluster, in face of blocks.		Save information on individual clusters to put in TAGG/2	<end loop2="" of="" over<="" td=""><td>repeat LOOP1 for +Z</td><td>Calculate angle between clusters found above.Flag colinear pairs of clusters in TAGG2</td><td>Create output banks</td><td>Return to TAGAN</td><td>10 10 10 10 10 10 10 10 10 10 10 10 10 1</td></end>	repeat LOOP1 for +Z	Calculate angle between clusters found above.Flag colinear pairs of clusters in TAGG2	Create output banks	Return to TAGAN	10 10 10 10 10 10 10 10 10 10 10 10 10 1



F11LHO.TAGG.S(TAGNOTE2)

DATE: 13/03/87 TIME: 12:42:11

---- 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 add 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 1979/50 auta only . He must also have the private calibration file 'F22HOW.PEDESTAL.ALLSP80' attached to fortran

The routine TAGAN

TAGAN (IERTAG, NRUN)

Arguments:

IERTAG - OUTPUT RETURN CODE

- INPUT DUMMY RUN NUMBER TO OVERIDE CONTROL OF WHICH ANALYSIS ROUTINE IS CALLED FOR MONTE CARLO **NRIIN** 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.

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 necessary 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

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.					
Ħ,	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,

carlo data it simulation didn't set tiag 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 i in TAGGTP)	I NOTES
Initialisation	TAGINT	
Read data in 'ATAG'	TAGADC	11) An overall calibration that 11) converts adc channel number to 11 MeV is applied. 12) Software addresses are used 12 from here on.
Subtract pedestals	TAGPED	I IThese are caused by fluctuating Ipedestals due to 50HZ AC pickup I on signal cables.It is only I treated in those events where

channels applied by the Le Croy ADC controler.Ammount to be subtracted is estimated on an event by event basis. ! Factors obtained from Kalibr. Apply calibration TAGKAL factors. Work out the sum TAGSUM(JPART, SUM)! Works out SUM for JPART end of energy in -Z and! (JPART = +/- 1) of energy in -Z and! +Z tagger. Sort adcs into I TAGSR1 order of decreasing! energy contents. Use sorted list to! TAGCLS find clusters of deposited energy. Store results in cluster map. **NOTES PROCESS** ROUTINE NAME (if not done in TAGGTP) 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 I This is the main routine where **TAGPOS** geometrical differences effect the software. The procedure adopted compares of blocks. 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 Save information

on individual clusters to put in TAGG/2

<end of LOOP2 over each cluster>

in the output)

repeat LOOP1 for +	zi	i	
Calculate angle between clusters found above.Flag colinear pairs of clusters in TAGG2			
Create output banks	TAGSTO		
Return to TAGAN	i	ĺ	

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_I^O 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

