February 9, 1987

JADE Computer Note 91

Neutral Triggers on Tape

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In the shutdown period 1981 - 1982 the trigger electronics system of the JADE detector underwent a thorough modification and update. New trigger elements were introduced, in form of energy sums of the various subsections of the Lead Glass system: the so called Barrel Groups (BG), Septants, Endcap Quadrants (EQ) and the Endcaps and the Barrel by themselves (see Jade Note 69). At the same time, the various triggers of JADE were revised and updated and new ones were added (see Jade Note 82). Finally the Reduc1 program underwent an update and was adjusted to accept the new triggers and bank formats.

During 1982 and the following years thoughts were still given to other possibilities of using the new lead glass segmentation for triggering (see e.g. Jade Note 74), in particular for the purpose of triggering on low energy neutral (i.e. all photon) final states. Several such special purpose triggers were also installed, in 1982 and later years. Being intended for close-to-detection-threshold physics, at the time of installations little or nothing was known about the possibilites to reduce the data that were obtained with these new triggers. Therefore, no changes were made to the Reduc1 program to accomodate them, and as a consequence, the events are not present on the REDUCONE tapes, the program is designed to reject all events with "unknown triggers", unless they have also one of the old and known trigger bits set.

In order to study these special events, a collection onto summary tapes was done directly from the Reform tapes and the summary tapes were then subjected to the standard Reduc2 program, modified to perform special cuts on the new trigger type events. In the course of time, these cuts were modified, based on deeper knowledge about the physics content of the new events. This redoing was possible since the Reduc2 program was fast enough to repeat the reduction from the summary tapes with new cuts. However, from 1985 onwards, the "neutral" triggers contain also many events with charged tracks and repeating the reduction for 1985-1986 is costly, in terms of CPU-time.

Thus a new series of Reduc2 tapes appear, containing to a large extent events which are not present on the standard Reduc1 and Reduc2 tapes. This note describes the new triggers, the cuts that are performed in Reduc2 and it also gives the names of the tapes where the data can be found. However, it does not give details of energy thresholds of the various components, which were used in the triggering.

1. The Coplanar Septant Trigger, T1 Accept bit 13 (Z 2000).

This trigger[1] requires 2 opposite (coplanar) septants, i.e. 2 septants separated by 2 septants (e.g. septants 1–4, 1–5, 2–5, 2–6, etc., are valid configurations). Furthermore there is a veto on any TOF counter. It was introduced in 1982, at Run 10493. In the run period 10493 - 10817 exactly 2 septants were required, from Run 10818 this was loosened to $\leq$ 3 septants (2 of which must be in coplanar configuration) and from Run 20245 (beginning of 1985) no restriction on additional septants was made. The trigger is primarily designed to trigger on final states of $\gamma\gamma$ produced resonances decaying into either $\gamma\gamma$ or $\pi^0\pi^0$. A measurement of $\Gamma_{\eta\to\gamma\gamma}$ using this trigger has been published by the Jade Collaboration (Phys.Lett.160B(1985)421). A typical event is shown in Fig.1 (η' decaying into $\pi^+\pi^-\eta, \eta \to \gamma\gamma$).

2. The Tagged Septant Trigger, T1 Accept bit 14 (Z 4000).

This trigger[2] requires $\geq$ 1 septant, no TOF counter set and the Tagging condition. It was introduced in autumn 1982, at Run 12757. It is designed to trigger the same reactions as the previous trigger, but at larger Q^2, where the resonance decay is no longer expected to appear in a balanced and coplanar fashion. An event is shown in Fig.2.

[1] Also known as "First Olsson Trigger".
[2] Also known as "First Zorn Trigger".

F Coplanar Septant Trigger, T1 Postpone bit 10 (Z 400).

, trigger[1] and the following can be seen as extensions of the previous ones, from the neutral final states can also contain charged tracks that do not reach the TOF counters) to final states which contain) tracks that reach the TOF counters, as well as photons. The T1 Postpone triggering condition is here anar septants, just as in the T1 Accept case, and ≥ 1 TOF and < 6 TOF. The T2 Accept condition is ck_{all}, with T2 coincidence bit 8 (Z 100). The trigger was permanently installed in spring 1985, at Run . As seen from the description, it is a "1-prong trigger". It contains interesting physics already at the t accessible charged track momentum. In order not to lose the events with tracks close to T2 triggering eshold, the filtering algorithm in the Plessey μ16 was changed, so that events with this trigger bit set were not rejected in the T2ANA part of the filter (the Z-vertex part of the filter was still allowed to reject). Similarly, the NORD-50 program (and also the FAMP) was modified so that the normal pattern recognition filtering did not apply to events with only this T2 coincidence bit. These changes were also active from Run 20300 onwards. In Fig.3 is shown a "typical" event (η' decaying into $\pi^+\pi^-\eta, \eta \rightarrow \gamma\gamma$).

4. The Tagged TOF Septant Trigger, T1 Postpone bit 11 (Z 800).

This trigger[2] requires ≥ 1 septant, ≥ 1 TOF and the Tagging condition as T1 Postpone condition. The T2 Accept condition is 1 Track_{all}, with T2 coincidence bit 9 (Z 200). Since no weak tracks were expected in this trigger, no special conditions were made for it in the online filtering algorithms. The trigger was installed in 1985, at Run 22587. An event is shown in Fig.4 (η' decaying into $\pi^+\pi^-\eta, \eta \rightarrow \gamma\gamma$).

5. The Septant – Endcap Quadrant Trigger, T1 Accept bit 4 (Z 10).

This trigger[3] requires a coplanar condition between a septant on the one hand and an Endcap Quadrant on the other hand. No TOF counter is allowed and as a further veto only 1 (or 2 neighboring) EQ is allowed. Since there are 7 septants and 2 x 4 EQ, the coplanar condition is somewhat complicated. It is given by any of the following combinations (for the numbering convention, see Fig.5):

Endcap Quadrants	Septants
1, 5	5, 6
2, 6	2, 6, 7
3, 7	1, 2, 3
4, 8	3, 4, 5

The trigger was installed in autumn 1985, at Run 23739. An example of an event is shown in Fig.5 (again η' decaying into $\pi^+\pi^-\eta, \eta \rightarrow \gamma\gamma$).

Special Online Conditions

The special exceptions installed for the third trigger have already been described above. The main background in the first, third and fifth triggers above are cosmic muons. In order to reject such background events online, the NORD-50 filtering program was set up to perform a fast analysis of the muon filter and reject events of these triggers if a muon signal was found. Details are given in Supplement 2 of Jade Note 78. The first Zorn trigger has also been subjected to this cosmic muon filtering, although not strictly necessary, since both Zorn triggers had a low rate. At times a high rate in the first Zorn trigger was experienced; it was however due to noise and high background in the tagging apparatus, when running at the highest Petra beam energies.

The first, third and fifth of the just described triggers had at times quite high rate and in order to reduce deadtime in data taking, there have been periods when they were not active ("Reduced Triggers"). Since 1985, the information about active triggers was written into the HEAD bank in every event (see Jade Note 32, Supplement 5) and so it is possible to map these periods out with software methods, in order to calculate the integrated luminosity for any particular trigger.

[1] Also known as "Second Olsson Trigger".
[2] Also known as "Second Zorn Trigger".
[3] Also known as "Krehbiel Trigger".

Cuts in Reduc 2

The general description of the Reduc2 program is found in Jade Computer Note 43. As already mentioned, the program was modified in order to accomodate the new triggers and special cuts were installed for them. The 5 different triggers fall into 2 groups, namely the 2 T1 Postpone triggers and the 3 T1 Accept triggers. The T1 Postpone triggers are only considered as special if no other T2 triggering condition is fulfilled. The following simple treatment has been applied in the reduction:

The T1 Postpone triggers routinely undergo the MUTANA analysis and are rejected if a muon signal is found. Since MUTANA was running in the online NORD–50 filtering all the time, this is largely redundant.

The T1 Postpone triggers with at least one good track (p_t >100 Mev/c and $\geq$ 16 fitted hits in rϕ and rz) undergo the normal track checks. Important is here that 1 good track is enough to fulfill the ratio condition used in Reduc2. In the Reduc1 filtering an event must have $\geq$ 1 track with p_t >600 Mev/c or $\geq$ 2 tracks with p_t >100 Mev/c.

The T1 Postpone triggers with no good track are accepted, unless they have a z-vertex with a quality flag > 1, outside the $\pm$ 350 mm limit.

The T1 Accept triggers with at least one good track (see above) undergo the normal track checks.

The T1 Accept triggers with no good track, but with tracks found by the pattern recognition program, are checked for the presence of at least 1 track originating in the fiducial cylinder with radius 30 mm and length $\pm$ 350 mm. In this case, there is no requirement on the number of fitted hits. If such a track is found, the event is accepted, otherwise rejected.

The T1 Accept triggers with no tracks found by the pattern recognition program, are checked for the presence of a muon signal. This check is done with 3 different programs, namely MUTANA (also run online), LGKOSM (also run online for other triggers) which searches for the so called "grazing cosmics", and finally with the subroutine FINCOS. FINCOS makes a combined search of the lead glass cluster situation and the hits in the inner detector, by laying a road between any pair of lead glass clusters and finding a minimum nr of hits in the inner detector, within this road (only in the rϕ projection). Both barrel and endcap clusters are considered and the roads are linear as well as curved. The program catches those cosmic muons which for various reasons did not produce enough hits in the muon filter to be seen by MUTANA. If no muon signal is found in the three routines, the event is accepted, otherwise rejected. Note that the Halfworld Energy Balance is not checked for these triggers, as is the case for other neutral events.

Finally it is worthwhile to mention that all the above triggers are simulated in the JADE Monte Carlo programs, albeit with "step-function" thresholds for the various energy sums. For details, see Supplement 2 of Jade Computer Note 66.

Summary Tapes

As already mentioned, events with any of the above mentioned trigger bits set, were collected directly from the REFORM tapes onto special summary tapes. These tapes are kept in the archive and have the names:

F11OLS.NEUSUM.RAWDATA0

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F11OLS.NEUSUM.RAWD349

A summary of the tape names, run periods and nr of events can be found in the member

JADEPR.TEXT(NEUSUM)

The Reduc2 tapes resulting from running the Reduc2 program on these "Rawdata" tapes are named

F11OLS.RED2NEU.TAPE82E etc...

They are given in detail in the following tables and are also found in the member

JADEPR.TEXT(RED2NEU)

Several facts should be noted:

Similar to the standard Reduc1 and Reduc2 events, processing has been done at times when only preliminary calibration for inner detector and lead glass was available. For 1986, the reduction was done after the final

JETC calibration was available, i.e. it was done in late autumn 1986 and spring 1987. Thus the JETC and Pattern recognition corresponds to the status on the standard Reduc1 and Reduc2 tapes in 1986. The new lead glass calibration for 1986 was made standard in January 1987 and the later part of the data have been processed with this calibration, the spring and summer data however with the preliminary (1985) lead glass calibration.

Some events have old trigger bits set as well as the new ones. Such events are probably also present on the standard Reduc2 tapes as well, unless rejected by Reduc1. If data selection is done from the standard data as well as from the RED2NEU tapes, this has to be born in mind when merging the selected samples.

No particular care has been taken to avoid cosmic runs or other kind of junk runs in the selection. If such runs contained any of the above triggers, the events will be on the summary tapes and might cause a number of warning prints from various routines (e.g. RUNFIX, EBEAM).

The large amount of data in 1985 and 1986 is mostly due to the relatively high rate of the third and fifth triggers described above. Also, 1985 and 86 correspond to about 110 pb^{-1}, the previous years gave less integrated luminosity.

Neutral Triggers on Tape 1982		
F110LS.RED2NEU.	Nr of Events	Run Period
TAPE82E	21424	10493 - 11754
TAPE82F	19573	11755 - 12384
TAPE82G	15222	12385 - 12948

Neutral Triggers on Tape 1983		
F110LS.RED2NEU.	Nr of Events	Run Period
TAPE83A	24182	12959 - 13248
TAPE83B	26955	13249 - 13698
TAPE83C	21192	13699 - 14373
TAPE83D	17029	14374 - 14467
TAPE83E	20455	14468 - 14500
TAPE83F	17338	14501 - 14536
TAPE83G	16816	14537 - 14586
TAPE83H	16180	14587 - 14820
TAPE83I	16116	14821 - 15082
TAPE83J	16903	15083 - 15689
TAPE83K	2233	12959 - 15689

Neutral Triggers on Tape 1984		
F110LS.RED2NEU.	Nr of Events	Run Period
TAPE84A	15917	15693 - 16241
TAPE84B	13512	16236 - 16733
TAPE84C	850	15693 - 16733
TAPE84D	17044	16734 - 17733
TAPE84E	18095	17734 - 17953
TAPE84F	17292	17954 - 18310
TAPE84G	12799	18311 - 18627
TAPE84H	10580	18628 - 18880
TAPE84I	12094	18881 - 19018

Neutral Triggers on Tape 1985		
F11OLS.RED2NEU.	Nr of Events	Run Period
TAPE85A	14804	19019 – 20368
TAPE85B	13577	20369 – 20498
TAPE85C	14512	20499 – 20611
TAPE85D	13964	20612 – 20717
TAPE85E	14258	20718 – 20821
TAPE85F	13796	20822 – 20938
TAPE85G	15024	20939 – 21056
TAPE85H	14670	21057 – 21189
TAPE85I	14389	21190 – 21323
TAPE85J	12023	21324 – 21434
TAPE85K	12501	21435 – 21547
TAPE85L	13443	21548 – 21689
TAPE85M	11729	21690 – 21811
TAPE85N	10153	21812 – 21922
TAPE85O	13294	21923 – 22060
TAPE85P	12336	22061 – 22168
TAPE85Q	12892	22169 – 22284
TAPE85R	11979	22285 - 22403
TAPE85S	12986	22404 – 22521
TAPE85T	13789	22522 – 22625
TAPE85U	13062	22626 – 22712
TAPE85V	13074	22713 – 22799
TAPE85W	13371	22800 – 22888
TAPE85X	13284	22889 – 22982
TAPE85Y	13018	22983 – 23093
TAPE85Z	12561	23094 – 23182
TAPE85ZA	12734	23183 – 23257
TAPE85ZB	13192	23258 – 23354
TAPE85ZC	13398	23355 – 23418
TAPE85ZD	15906	23419 – 23497
TAPE85ZE	15697	23498 – 23568
TAPE85ZF	16868	23569 – 23654
TAPE85ZG	16927	23655 – 23732
TAPE85ZH	16759	23733 – 23789
TAPE85ZI	17108	23790 – 23840
TAPE85ZJ	17476	23841 – 23903
TAPE85ZK	19020	23904 – 23962
TAPE85ZL	19023	23963 – 24019
TAPE85ZM	19777	24020 – 24099
TAPE85ZN	17485	24100 – 24160
TAPE85ZO	9129	24161 – 24197

Neutral Triggers on Tape 1986 Part I		
F110LS.RED2NEU.	Nr of Events	Run Period
TAPE86DA	17803	24212 - 24434
TAPE86DB	15400	24435 - 24578
TAPE86DC	19621	24579 - 24755
TAPE86DD	19899	24756 - 24856
TAPE86DE	18035	24857 - 24907
TAPE86DF	18379	24908 - 24967
TAPE86DG	20888	24968 - 25031
TAPE86DH	20723	25032 - 25093
TAPE86DI	20447	25094 - 25165
TAPE86DJ	20728	25166 - 25219
TAPE86DK	20836	25220 - 25263
TAPE86DL	20937	25264 - 25315
TAPE86DM	21157	25316 - 25366
TAPE86DN	20945	25367 - 25429
TAPE86DO	21214	25430 - 25481
TAPE86DP	21489	25482 - 25539
TAPE86DQ	22593	25540 - 25598
TAPE86DR	23678	25599 - 25655
TAPE86DS	24120	25656 - 25713
TAPE86DT	23027	25714 - 25777
TAPE86DU	22888	25778 - 25835
TAPE86DV	18448	25836 - 25885
TAPE86DW	20132	25886 - 25942
TAPE86DX	21400	25943 - 26000
TAPE86DY	21946	26001 - 26051
TAPE86DZ	22960	26052 - 26105
TAPE86EA	22151	26106 - 26159
TAPE86EB	22701	26160 - 26212
TAPE86EC	23647	26213 - 26271
TAPE86ED	24056	26272 - 26354
TAPE86EE	23776	26355 - 26411
TAPE86EF	23904	26412 - 26468
TAPE86EG	23014	26469 - 26520
TAPE86EH	23251	26521 - 26579
TAPE86EI	23839	26580 - 26653
TAPE86EJ	24442	26654 - 26714
TAPE86EK	23929	26715 - 26772
TAPE86EL	23824	26773 - 26871
TAPE86EM	24518	26872 - 26955
TAPE86EN	23970	26956 - 27048
TAPE86EO	24789	27049 - 27153
TAPE86EP	24932	27154 - 27219
TAPE86EQ	24544	27220 - 27287
TAPE86ER	24914	27288 - 27393
TAPE86ES	24414	27394 - 27475
TAPE86ET	23856	27476 - 27553
TAPE86EU	24088	27554 - 27614
TAPE86EV	23547	27615 - 27664
TAPE86EW	24203	27665 - 27722
TAPE86EX	23867	27723 - 27780
TAPE86EY	23867	27781 - 27834
TAPE86EZ	24835	27697 - 27879

Neutral Triggers on Tape 1986 Part II		
F110LS.RED2NEU.	Nr of Events	Run Period
TAPE86FA	22861	27880 - 27950
TAPE86FB	20638	27951 - 28002
TAPE86FC	22070	28003 - 28046
TAPE86FD	19958	28047 - 28088
TAPE86FE	22396	28089 - 28132
TAPE86FF	23062	28133 - 28187
TAPE86FG	23075	28188 - 28227
TAPE86FH	23368	28228 - 28272
TAPE86FI	23358	28186 - 28321
TAPE86FJ	23605	28306 - 28364
TAPE86FK	24363	28365 - 28419
TAPE86FL	23793	28420 - 28474
TAPE86FM	23158	28475 - 28522
TAPE86FN	23348	28523 - 28581
TAPE86FO	21280	28533 - 28618
TAPE86FP	23086	28619 - 28656
TAPE86FR	20967	28699 - 28810
TAPE86FS	22399	28811 - 28894
TAPE86FT	23743	28895 - 28939
TAPE86FU	23427	28940 - 28987
TAPE86FV	20841	28988 - 29037
TAPE86FW	23771	29038 - 29082
TAPE86FX	23148	29083 - 29130
TAPE86FY	22975	29131 - 29173
TAPE86FZ	22663	29174 - 29217
TAPE86GA	23207	29218 - 29256
TAPE86GB	23205	29257 - 29302
TAPE86GC	23489	29303 - 29346
TAPE86GD	23325	29347 - 29392
TAPE86GE	23166	29393 - 29443
TAPE86GF	23533	29444 - 29490
TAPE86GG	23632	29491 - 29545
TAPE86GH	23340	29546 - 29597
TAPE86GI	23639	29598 - 29648
TAPE86GJ	23807	29649 - 29702
TAPE86GK	24002	29703 - 29746
TAPE86GL	24390	29747 - 29789
TAPE86GM	23873	29790 - 29835
TAPE86GN	23917	29836 - 29880
TAPE86GO	23652	29881 - 29927
TAPE86GP	23333	29928 - 29973
TAPE86GQ	23399	29974 - 30026
TAPE86GR	23340	30027 - 30073
TAPE86GS	23405	30074 - 30121
TAPE86GT	23252	30122 - 30165
TAPE86GU	23072	30166 - 30210
TAPE86GV	23734	30211 - 30233
TAPE86GW	23762	30234 - 30302
TAPE86GX	22615	30303 - 30353
TAPE86GY	13493	30354 - 30397

DSN F110LS.TR22GAM.MNEU86G3
26676 1432 914
IDHITS 94
ELGTOT 366
MUHITS 0
LGCYL 366
LGCAPS 0 0
FWCAPS 0 0

JADE

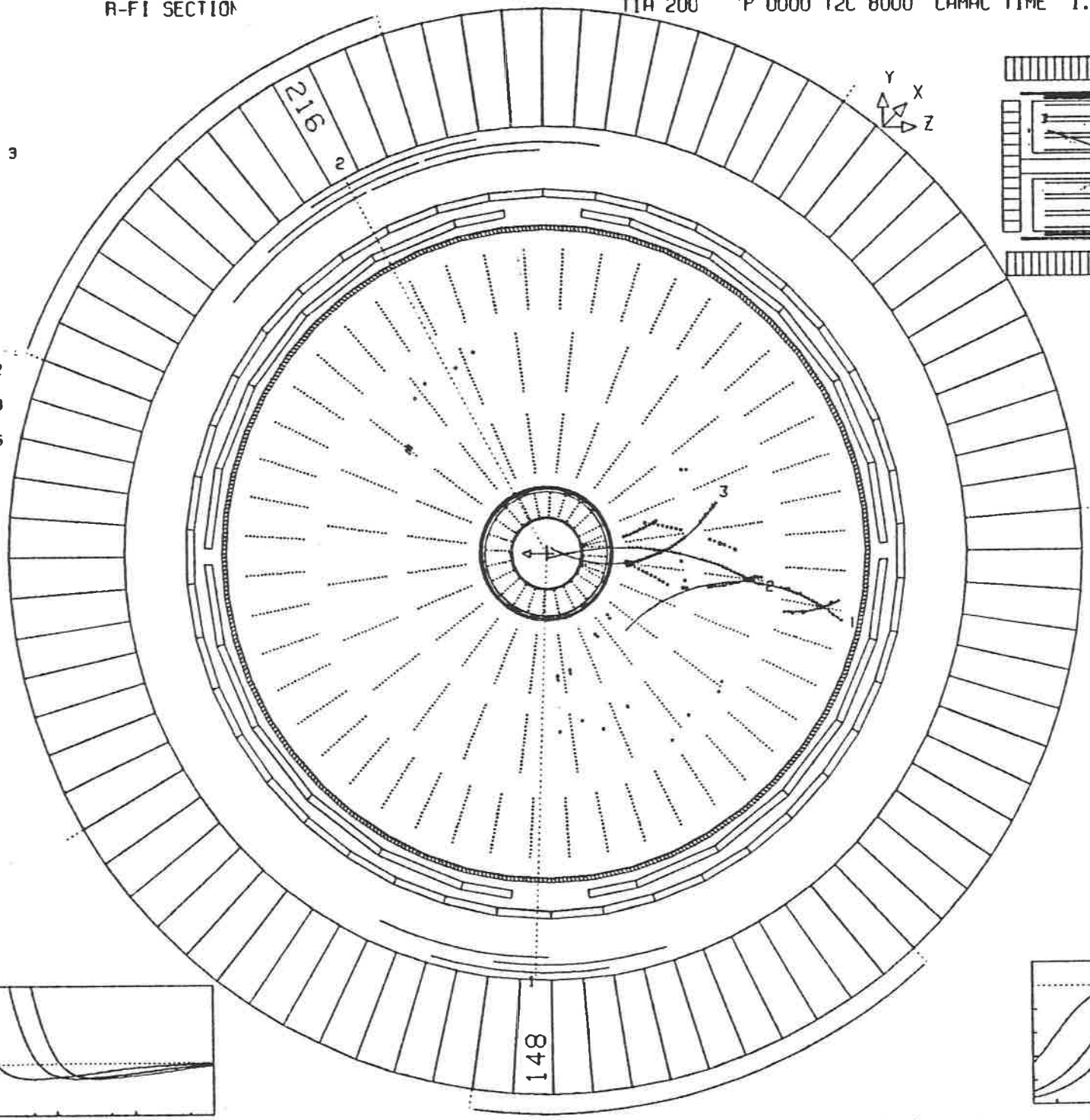
R-FI SECTION

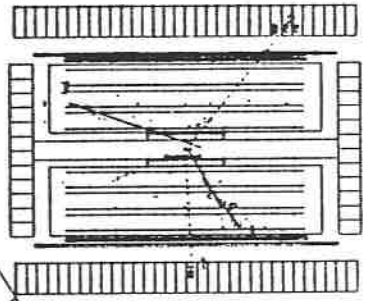
BEAM 17.500 GEV FIELD -4.837 KG TALC C809 DATE 22/07/86 TIME 23.06.53
TIA 200 'P 0000 T2C 8000 CAMAC TIME 1.39. 5 13/ 6/1986

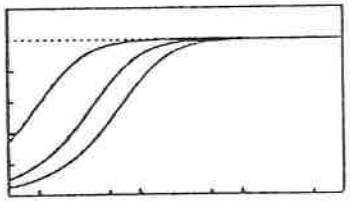
BANK PATR 10 NR OF TRACKS 3
NR +- RMSRFI RMSRZ/HIT PHI
PTOT PLONG PTRANS COSTHE

1 + 0.94/20 57.9/17 181.4
0.074 0.044 0.060 0.597
2 + 0.66/28 60.8/22 181.9
0.120 0.057 0.106 0.475
3 - 0.81/25 51.1/15 173.0
0.136 -0.128 0.046 -0.941

BANK LGCL 1 NR OF CLUSTERS 2
NR 1 BARREL PHOTON 1
E 0.167 FI 272.1 COST 0.048
NR 2 BARREL PHOTON 2
E 0.257 FI 62.1 COST 0.645







*** SUMS (GEV) *** PTOT 0.331 PTRANS 0.212 PLONG 0.230 CHARGE 1
TOTAL CLUSTER ENERGY 0.424 PHOTON ENERGY 0.424 NR OF PHOTONS 2

Fig. 7

DSN F110LS.TR02GAM.TAG86DU1
25615 1846 5
IDHITS 6
ELGTOT 877
MUHITS 1
LGCYL 877
LGCAPS 0 0
FWCAPS 699 17613

JADE

R-FI SECTION

BEAM 17.501 GEV FIELD -4. 4 KG TALC C809 DATE 09/02/87 TIME 19.07.07
T1A 4000 T1P 0000 T2C 8000 CAMAC TIME 38. 2. 3 28/ 4/1986

BANK PATR 10 NR OF TRACKS 0
NR +- RMSRFI RMSRZ/MIT PHI
PTOT PLONG PTRANS COSTHE

BANK LGCL 1 NR OF CLUSTERS 2
NR 1 BARREL PHOTON 1
E 0.790 FI 131.9 COST 0.359
NR 2 BARREL PHOTON 2
E 0.231 FI 173.6 COST-0.667

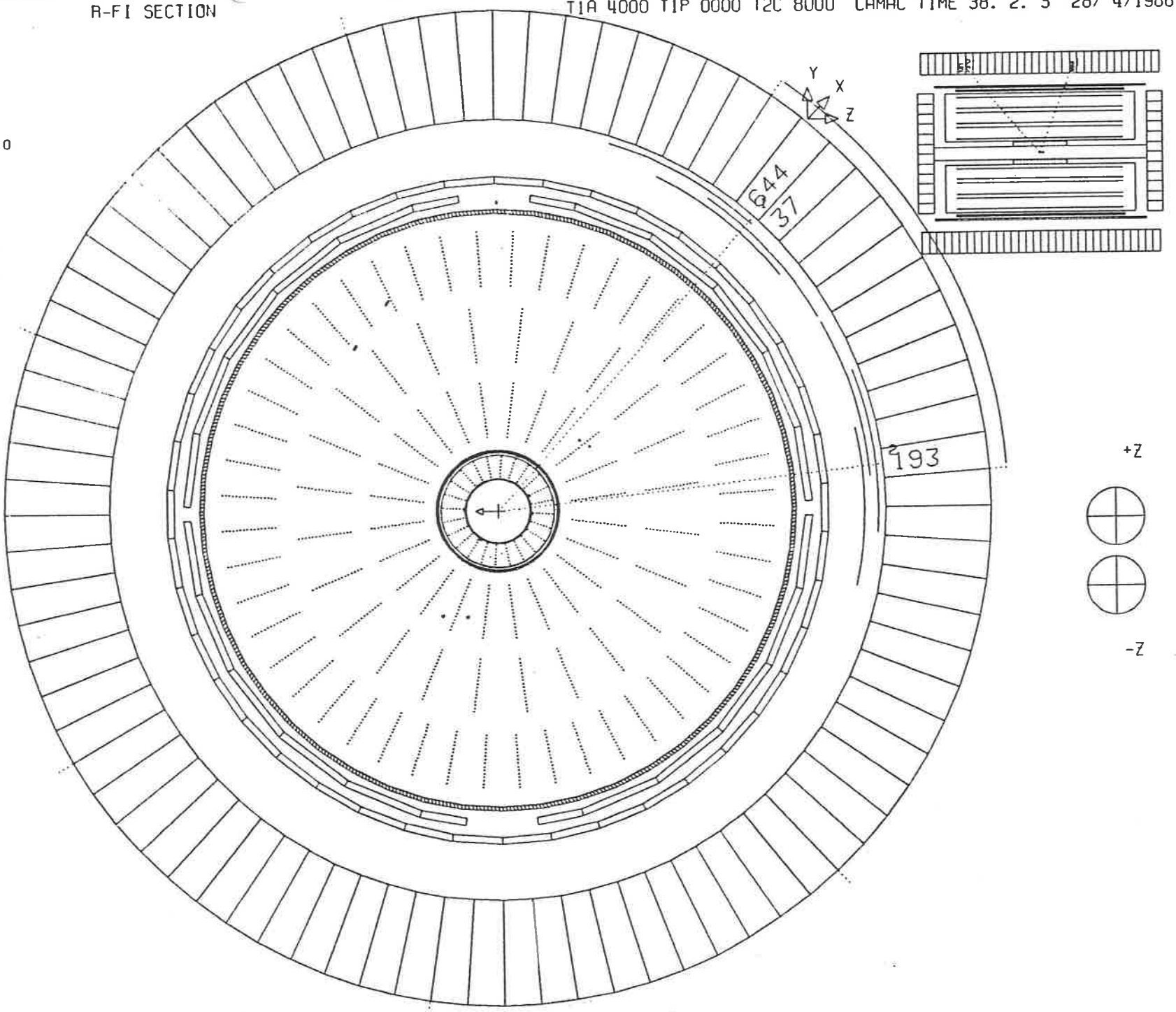


FIG. 2

DSN F110LS.TR22GAM.MNEU86J1
27752 5487 512
IDHITS 255
ELGTOT 493
MUHITS 0
LGCYL 493
LGCAPS 0 0
FWCAPS 0 0

JADE

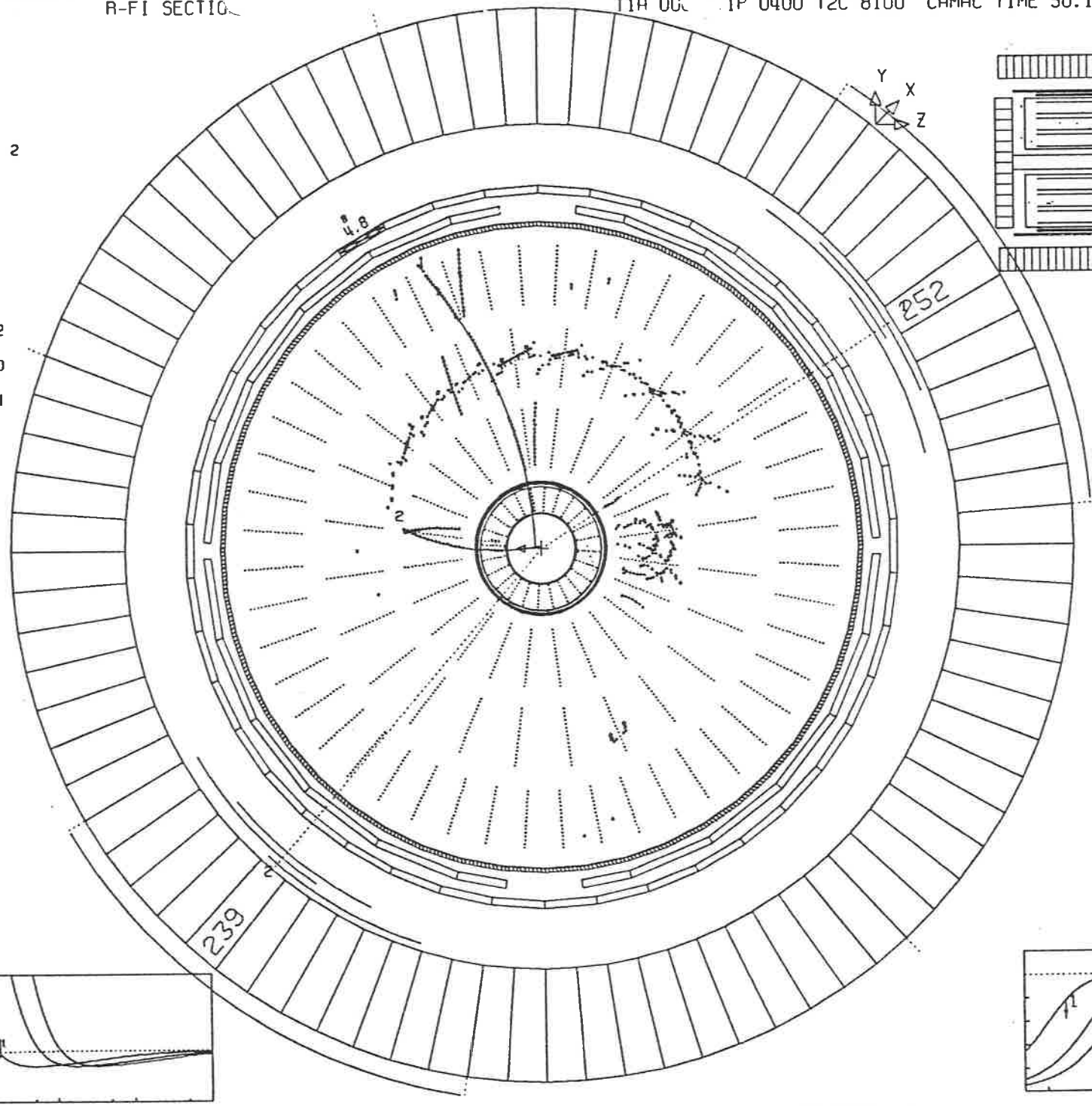
BEAM 17.500 GEV FIELD -[illegible]850 KG TALC C872 DATE 16/09/86 TIME 19.52.34
T1A 0G[illegible] T1P 0400 T2C 8100 CAMAC TIME 50.17. 9 28/ 7/1986

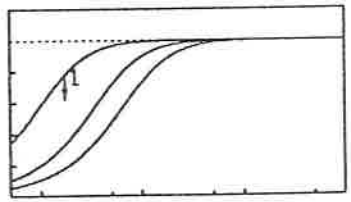
R-FI SECTIO[illegible]

BANK PATR 10 NR OF TRACKS 2
NR +- RMSRFI RMSRZ/HIT PHI
PTOT PLONG PTRANS COSTHE

1 - 0.85/47 59.8/41 77.5
0.172 0.036 0.168 0.212
2 + 0.59/16 37.9/15 8.9
0.104 0.058 0.086 0.562

BANK LGCL 1 NR OF CLUSTERS 2
NR 1 BARREL PHOTON 1
E 0.297 FI 147.9 COST 0.600
NR 2 BARREL PHOTON 2
E 0.269 FI 310.7 COST-0.131





*** SUMS (GEV) *** PTOT 0.276 PTRANS 0.254 PLONG 0.095 CHARGE 0
TOTAL CLUSTER ENERGY 0.567 PHOTON ENERGY 0.567 NR OF PHOTONS 2

DSN F110LS.TR22GAM.MNEU86P2
29778 1822 1147
IDHITS 93
ELGTOT 611
MUHITS 1
LGCYL 611
LGCAPS 0 0
FWCAPS 417 7449

JADE

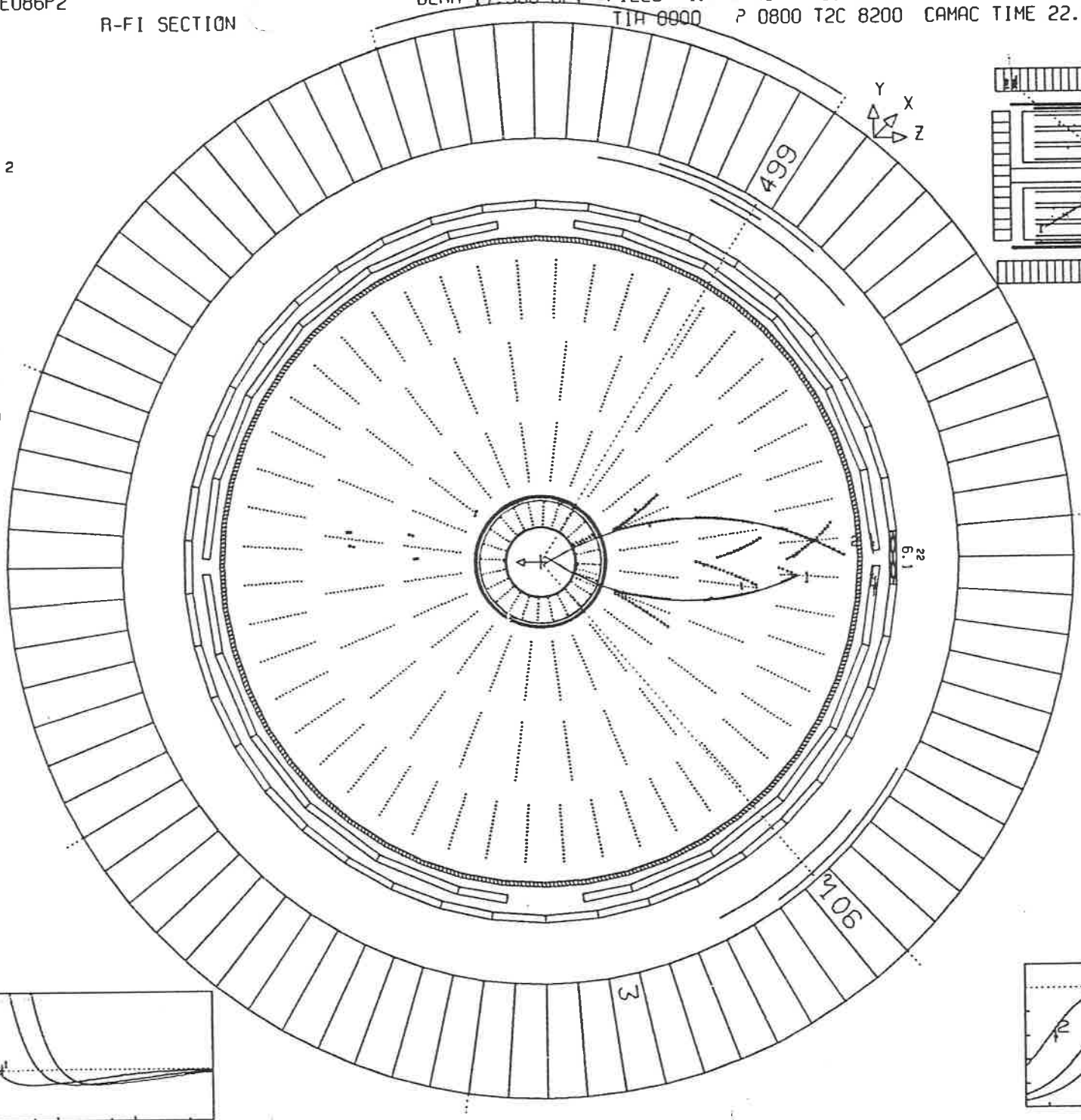
R-FI SECTION

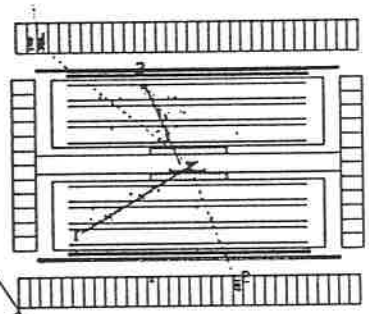
BEAM 17.500 GEV FIELD -4.837 KG TALC C872 DATE 24/11/86 TIME 14.07.22
TIM 0800 P 0800 T2C 8200 CAMAC TIME 22.29.10 12/10/1986

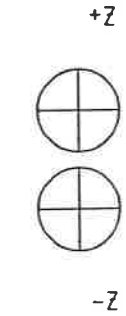
BANK PATR 10 NR OF TRACKS 2
NR +- RMSRFI RMSRZ/HIT PHI
PTOT PLONG PTRANS COSTHE

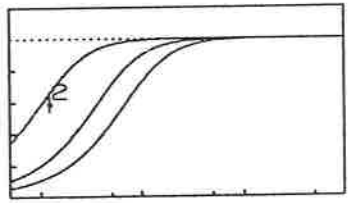
1 - 0.79/36 45.0/35 197.4
0.191 -0.165 0.097 -0.862
2 + 0.70/46 46.3/44 163.6
0.122 -0.048 0.112 -0.391

BANK LGCL 1 NR OF CLUSTERS 2
NR 1 BARREL PHOTON 1
E 0.641 FI 122.1 COST-0.781
NR 2 BARREL PHOTON 2
E 0.121 FI 229.3 COST 0.370









*** SUMS (GEV) *** PTOT 0.313 PTRANS 0.209 PLONG 0.213 CHARGE 0
TOTAL CLUSTER ENERGY 0.762 PHOTON ENERGY 0.762 NR OF PHOTONS 2

FIG. 4

DSN F110LS.TR22GAM.MNEU86B2
25092 142 476
IDHITS 196
ELGTOT 755
MUHITS 0
LGCYL 238
LGCAPS 517 0
FWCAPS 0 364

JADE

R-FI SECTIO

BEAM 17.500 GEV FIELD -4.940 KG TALC C809 DATE 20/12/86 TIME 18.37.11
T1A 001 IP 0000 T2C 8000 CAMAC TIME 35.55. 2 27/ 3/1986

BANK PATR 10 NR OF TRACKS 2
NR +- RMSRFI RMSRZ/HIT PHI
PTOT PLONG PTRANS COSTHE

1 + 1.28/28 35.1/22 270.4
0.113 -0.092 0.066 -0.813
2 - 0.35/31 35.3/31 182.2
0.080 -0.046 0.065 -0.580

BANK LGCL 1 NR OF CLUSTERS 2
NR 1 BARREL PHOTON 1
E 0.315 FI 55.2 COST-0.805
NR 2 ENDCAP PHOTON 2
E 0.614 FI 240.9 COST-0.915

42
194

1 2 3 4 5 6 7

Y X Z

+Z
5 6
8 7
1 2
4 3
-Z

Y Z X

*** SUMS (GEV) *** PTOT 0.193 PTRANS 0.131 PLONG 0.138 CHARGE 0
TOTAL CLUSTER ENERGY 0.929 PHOTON ENERGY 0.929 NR OF PHOTONS 2