CB-Note 313

Report on the last CB-Runs 8.10 - 9.12 1996

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1 General Remarks

This run report covers the run period between 8 October and 9 December 1996, which also happens to be the last run period in CB history. Due to the long measurement time (almost 3 months) the run co-ordination was split in three periods (see table 1 for an overview). Note, that the triggers

Run Time	Co-ordination	Trigger	$\bar{p}$-Momenta ($\frac{MeV}{c}$)
17.10 - 27.10 1996	W.Roethel et al. (Munich)	0 & 2 prong	900, 1800
28.10 - 17.11 1996	P.Schmidt (Hamburg)	0-prong	900, 1642, fine scan
18.11 - 9.12 1996	A.Berdoz, C.Meyer (CMU)	0 & 2 prong	1525, 1642

Table 1: *Run co-ordination, trigger and antiproton momenta in last CB-run.*

mentioned in table 1 refer to the triggers mainly used for data taking. As is usual procedure, also a certain amount of minimum bias and other triggers were applied (details given below).

The overall performance of the detector during these weeks was very stable and reliable. Main problems occured due to general power failures and/or machine problems at LEAR.

2 Trigger Conditions

The main trigger conditions are shown in table 2. For check-ups an additional trigger allowing for 2-or-more prongs was set-up.

Please note, that in case of all 0-prong triggers the Quick Energy Sum (Tony's Box) was applied. As is common practice, the energy threshold was adjusted at the beginning of each new $\bar{p}$ - momentum by using online data.

3 Accumulated Data

The following lists (3, 5, 7 and 6) show all data taken during the three different run-coordination periods.

Trigger name	SVX multiplicity	JDC multiplicity
2-Pr.default	0-3	2 in layer 9/10
0pr24.900	2	4 in layer 9/10
or	0	0 in Layer 2/3
		and 0 in Layer 9/10
0-Pr_nm.xxx	no SVX	0 in layer 2/3
	instead Tonys box	0 in layer 9/10

Table 2: *Main Trigger Conditions used in 96 Oct-Dec run. In the 0-prong Trigger, the xxx refers to the beam momentum used.*

3.1 8 October - 27 October

Includes 900 and 1800$\frac{MeV}{c}$ data taking. Very briefly a Kshort trigger was tested, but this trigger was abandoned in the end. The accumulated data per momentum and trigger can be seen in table 3.

Triggername	Events @ 900	Events at 1800
0-pr-nm.900	1.95 M	6.72 M
0-pr-24.900	2.22 M	
2ormore	0.134M	3.4M (and 200K for testing)
minimum bias	21K	
2 prong.default	21.01M	7K

Table 3: *Summary of statistics for the 900 and 1800* $\frac{Mev}{c}$ *running*

3.2 28 October - 17 November 1996

This periods includes data taking for the *fine scan* and mostly 0-prong measurements at 900 and 1642 $\frac{MeV}{c}$.

3.2.1 Fine Scan

List 4 shows the used trigger files and their corresponding antiproton momenta (at extraction) as measured by LEAR.

Trigger Name	Antiproton Momenta
$1415\frac{MeV}{c}$	$1412{,}9\frac{MeV}{c}$
$1420\frac{MeV}{c}$	$1416{,}4\frac{MeV}{c}$
$1426\frac{MeV}{c}$	$1422\frac{MeV}{c}$
$1432\frac{MeV}{c}$	$1428{,}7\frac{MeV}{c}$
$1437\frac{MeV}{c}$	$1436{,}4\frac{MeV}{c}$
$1443\frac{MeV}{c}$	$1443{,}06\frac{MeV}{c}$
$1449\frac{MeV}{c}$	$1448{,}74\frac{MeV}{c}$
$1454\frac{MeV}{c}$	$1454{,}42\frac{MeV}{c}$
$1460\frac{MeV}{c}$	$1460{,}5\frac{MeV}{c}$

Table 4: *Exact values of antiproton momenta and their corresponding trigger names.*

The number of accumulated data during the fine scan are listed in 5. Also listed therein are the corresponding run- and tape numbers.

The fine scan had to be interrupted for a few days as serious machine problems occured at LEAR (see below). In these days measurments were taken at a momentum of $1642\frac{Mev}{c}$ sharing the beam with PS185.

3.2.2 900 and 1642 0-prong data

List 6 shows all data taken during the 0-prong run at 900 and $1642\frac{MeV}{c}$:

3.3 18 November - 9 December 1996

For testing purposes a few runs with bsvp1j1.sts (small bias in 7) instead of the regular file were taken.

$\bar{p}$-momentum	Run-Number	Tapes	Events
$1415\frac{MeV}{c}$	42041 - 42087		834k
$1420\frac{MeV}{c}$	42087 - 42110		460k
$1426\frac{MeV}{c}$	42111 - 42146		570k
$1432\frac{MeV}{c}$	42147 - 42212		1.235M
$1437\frac{MeV}{c}$	42407 - 42463		1.145M
$1443\frac{MeV}{c}$	42464 - 42490		448k
$1449\frac{MeV}{c}$	42491 - 42533		505k
$1454\frac{MeV}{c}$	42534 - 42566		549k
$1460\frac{MeV}{c}$	42567 - 42597		659k

Table 5: *List of accumulated zero-prong data between October 28 and November 17. Note that for the fine scan momenta ($14xx\frac{MeV}{c}$ the momenta are the names of the trigger files. The exact values (as calculated by LEAR) are to be looked up in 4*

Trigger	Events @ 900	Events @ 1642
0-prong	15.8M	6.9M

Table 6: *List of accumulated zero-prong data between October 28 and November 17 for $\bar{p}$ momenta at 900 and 1642$\frac{MeV}{c}$.*

Trigger	Events @ 1525	Events at 1642
O prong	10.035 M	10.109 M
2ormore	0.134M	0.056M (since 2 Dec.)
minimum bias	20.115M	
small bias	0.164M	
2 prong	4.479M	12.403M

Table 7: *Summary of statistics for the 1525 and 1642 $\frac{Mev}{c}$ running*

4 Performance of Detector Components

4.1 Beam Counters

At the beginning of the run period problems with the Si-centre counter were reported (high noise level - bad signal/noise ratio). At 900 $\frac{MeV}{c}$ the efficiency was 85% and went down to 75% at $1800\frac{MeV}{c}$.

The following $\bar{p}$ stop condition was used (0-level):

$$\overline{p}_{stop} = (Si^{low}_{center} \wedge \overline{High}) \wedge (\sum_{i=1}^{4} \mathrm{OR}(Si^{low}_{i} \wedge \overline{High})) \quad \text{where} \quad High = \sum_{i=1}^{4} Si^{high}_{i} \vee Si^{high}_{center}$$

The pile-up flag was provided by the proportional chamber (KC).

The ratio of $Si_{center} \wedge \sum_{i=1}^{4} Si_i : KC$ constituted the criterion by which beam steering quality was monitored. These scalers were viewed on a CRT in the control room. A typical beam tune would reads 85% to 90%of the beam going through the central silicon detector.

4.2 Silicon Vertex Detector

The SVTX was used extensively in the triggers and performed well without much attention during most of the time.

Channel 12 of the SVX was inactive during the 2-prong run at $900\frac{MeV}{c}$. This was fixed during the break caused by the first power failure. To check the performance of the SVX an additional 2-prong trigger was set up to allow for 2 or more tracks.

Extra noise in the backplane was traced to a gating problem with the viking system and was fixed on 1.12. 96 by regenerating the NIM signal going into the CONV gate. This is also believed to be the reason of few SVTX readout hangups.

4.3 JDC

On rare occasions the JDC tripped to unexpected high beam intensities during data taking. Otherwise the JDC performed reliably.

Some FADC modules had to be replaced due to blown fuses.

A temporary problem concerning the JDC cooling was mentioned on 20.11. 96. This led to preamplifier tripping. More fluid to the preamp

cooling was added and the temperature trip set point was risen by 0.50 . A broken wire on the preamp power supply was fixed during the run.

4.4 Target

No problems.

4.5 Calorimeter

The overall performance of the Calorimeter and its readout system was reliable during most of the run.

4.5.1 Crystals

No problems to report.

4.5.2 Readout

A water leakage in the electronics hut caused problems with some connections of FERA modules in the first week of the run period.

The two days power failure in November didn't result in serious FERA problems except few bad linearities with crate 15, which disappeared quickly after a short warming up period. FERA 1353 was reported to be unstable.

The 2282 crystal readout worked fine during the run with the exception of channel 984. The pedestals were unstable showing occasional changes of +/- 100.

No problems were reported concerning the FACE and Lightpulser system.

4.6 Magnet

Due to power failure a magnet trip was reported which created some problems with the water cooling.

4.7 DAQ

In principle the data aquisition system was working extremely stable. Occasionally problems with j1xtal and j2xtal timouts occured and some EVB hangups were reported.

4.8 LEAR

Beam delivery was quite reasonable for most of the running period with few minor problems like dipole instabilities, sudden and unexpected high beam intensities (see JDC) etc. .

There were also some machine fall-outs.

The first two power failures occured during the first three weeks of the run period. In the first instance the power failure caused a loss of 2 hours as only the cooling system of the JDC preamps was affected. The second total power failure led to 14 hours beam loss.

A special machine problem occured during the *fine scan* period, which meant that only four of the eight planned fine scan points could be measured in the period originally forseen for the fine scan experiment (4 Nov. - 8 Nov). The remaining scan points were taken later (11 Nov. - 14. Nov.).

Another fall-out occured due to a general power failure on 30 November which brought the entire CERN complex down. It took LEAR about 52 hours to recover fully.

For most of the time CB ran as the main user. Beam sharing with PS185 took place for testing purposes before 20 November and constantly after 20 November.

The servo system allowing to have a smooth start of the spill worked fine.