ISR RUNNING IN

Preparation for physics in Runs 54 and 58

Run 54, 18 May, 1971. 26.5 GeV/c, 4 bunches

The magnet settings used in this run are discussed by B. Autin and J-P. Gourber in a running-in report of May 24. The stacking and lifetime of the beam is discussed by L. Resegotti in a running-in report of May 21.

The luminosity curves measured during this run for intersecting points 2, 3, and 6 are shown in figures 1 to 3 (sketched by J.C. Sens). Background curves for this run are available in our files.

The vertical closed orbit deviations in the intersecting points are indicated in the figures; they were not corrected.

Run 58, 24 May, 1971. 22.4 GeV/c, 20 bunches

The beam current limit for this run was set at 1.5 Amps on request of the physicists.

Ring 2 was filled to 1.536 A. Stacking was at the top with acceleration out to about 64 mm from the injection orbit. The working point was DANA.

Ring 1 was filled to 1.530 A. Stacking was at the bottom with acceleration to about 72 mm from the injection orbit. The working point was FATA.

Both beams were scraped at the inside and on the vertical dimension. The beam currents after this operation were $i_1 = 1.4921$ A and $i_2 = 1.4376$ A.

The vertical closed orbit deviations (Autin) were:

<table>
<thead>
<tr>
<th></th>
<th>Ring 1</th>
<th>Ring 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-1</td>
<td>- 1</td>
<td>+ 1.6</td>
</tr>
<tr>
<td>I-2</td>
<td>- 0.1</td>
<td>- 1</td>
</tr>
<tr>
<td>I-5</td>
<td>+ 0.4</td>
<td>0</td>
</tr>
<tr>
<td>I-6</td>
<td>- 0.8</td>
<td>+ 2.3</td>
</tr>
</tbody>
</table>

 corrected
The two largest deviations in Ring 2 were corrected.

The luminosity curves were measured with these beams in intersecting points 1, 2, 5 and 6. The curves were poor and showed an increase in the effective beam height of up to about 6 mm (compared with 5 mm in Run 54). Also the background values were high. (These curves are available in our files.)

It was observed that the stack in Ring 1 was vertically very large. After discussing the poor results it was concluded that the stack was made too far out (72 mm) touching probably a resonance at that location. Therefore a new stack was made this time at the top and accelerated to 64 mm from the injection orbit, (Hansen).

This stack did not touch the resonance and showed lower background values. No new curves could be measured in the remaining time.

The lifetime data for the beams are:

<table>
<thead>
<tr>
<th>Ring</th>
<th>Time</th>
<th>Current</th>
<th>Width</th>
<th>Decay Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ring 1</td>
<td>23.28 hr</td>
<td>1.5285 A</td>
<td>1.5230 A</td>
<td>$1.2 \times 10^{-5}$/min</td>
</tr>
<tr>
<td></td>
<td>04.30 hr</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ring 2</td>
<td>23.28 hr</td>
<td>1.4205 A</td>
<td>1.4170 A</td>
<td>$2.7 \times 10^{-5}$/min</td>
</tr>
<tr>
<td></td>
<td>01.00 hr</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

At 01.00 hr a current change in an experimental magnet in I-2 (experiment R202) caused a 3.3 mA loss in Ring 2.

<table>
<thead>
<tr>
<th>Ring 2</th>
<th>Time</th>
<th>Current</th>
<th>Width</th>
<th>Decay Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>01.17 hr</td>
<td>1.4137 A</td>
<td></td>
<td>$3 \times 10^{-5}$/min</td>
</tr>
<tr>
<td></td>
<td>04.30 hr</td>
<td>1.4056 A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The beam size measurements with the scanning probes gave the following results:
<table>
<thead>
<tr>
<th></th>
<th>time</th>
<th>current loss due to measurement</th>
<th>inner</th>
<th>outer</th>
<th>lower</th>
<th>upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ring 1</td>
<td>22.50</td>
<td>1.5319 - 1.5306</td>
<td>-23.9</td>
<td>+54.6</td>
<td>-19.4</td>
<td>+12.9</td>
</tr>
<tr>
<td></td>
<td>05.00</td>
<td>1.4835 - 1.4827</td>
<td>-26.7</td>
<td>+65.3</td>
<td>-23.4</td>
<td>+16.8</td>
</tr>
<tr>
<td>Ring 2</td>
<td>22.00</td>
<td>1.4248 - 1.4245</td>
<td>-25.2</td>
<td>+54.5</td>
<td>-21.2</td>
<td>+10.9</td>
</tr>
<tr>
<td></td>
<td>04.45</td>
<td>1.4045 - 1.4033</td>
<td>-20.4</td>
<td>+54.5</td>
<td>-22.3</td>
<td>+12.1</td>
</tr>
</tbody>
</table>

The difference in current in Ring 1 at 04.30 hr (1.5230 A) and 05.00 hr (1.4835 A) is due to scraping.

F. Bonaudi
D. Neet

Distribution
Running In Committee
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Experimental Groups
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Run 54

10/5/74

Luminosity $I_2$

$26.5/26.8$ GeV

$I_1 = 1.69$ A

$I_2 = 0.722$ A

Closed Orbit

$R_2 = +0.9$ mm

$R_0 = -3 \rightarrow -3.5$ mm

$\frac{L}{\mu A_{w_2}} = 2 \times 10^{-3} /m^2 /mC /m^2$
COUNTS/10SEC

10/15/71

LUMINOSITY IS
26.5/28.5 GeV

E_{18} = 140 GeV

SET AT

\( \frac{21}{22} = 1.20 \)

\( \frac{22}{22} = 1.40 \)

\( I_1 = 1.09 \text{ A} \)

\( I_2 = 0.922 \text{ A} \)

\( \frac{L}{A^2} = 1.9 \times 10^{-28} \text{ cm}^2/\text{sec} \)

CLOSED ORBIT

\( R_1 = 0.8 \text{ mm} \)

\( R_2 = -1.5 \text{ mm} \)

Fig 2
Run 54
18/5/71

LUMINOSITY I6

26.5/26.5 GeV

$I_1 = 1.09 A$

$I_2 = 6.921 A$

CLOSED ORBIT

$R_y = 0.5 \text{ mm}$

$R_x = 2 \text{ m}$

SET AT

$R_y = +0.3 \text{ mm}$

$R_x = -0.3 \text{ m}$

Fig 3

FABRICATION SUISSE