ISR-ES/FB/GK/11

4.1.1972

ISR PERFORMANCE REPORT

Run 133, 15.12.1971, 22 GeV, 20 bunches

Purposes

Initially three distinct experiments were foreseen:

- Radiation effects on experiment R 204
- Septum test for experiment R 202
- Radial bumps and background

Owing to the PS failure on Monday the 13th, we tried to concentrate the three experiments in two hours of machine development. For that reason we were not able to "play" with all the desired parameters in a systematic manner. Nevertheless, we got a few indications.

I. Radiation effects on experiment R 204

1) Purpose

To test the efficiency of an iron shielding installed near the cameras for protecting them from beam transfer (TT 1) disturbances.

2) Experiment

The current of VB 403 M was increased by 5%. In total, about fifty pulses of protons were injected in this manner: 20 "up", 10 "there" and 20 "down". The intensity was $\sim 1.8.10^{12}$ protons/pulse.

3) Effect

The polaroid films placed in front of the shielding were fully saturated, while those behind the shielding still show some radiation effects. A number of film badges were also exposed;

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~~they are being analysed by the Health Physics.~~

II. Test on the septum magnet of experiment R 202

1) Purposes

- To test the computer programme allowing for a given main current a band for the correcting current and vice versa.
- Above all to observe the effect of changes of the septum magnet currents on the ISR beams.

As in parallel we were working on radial bumps in I6, we took advantage by observing also the effects of changes of the septum magnet current on ISR beams with different bumps.

2) Data acquisition

The following data :

- main and correction currents of Septum Magnet
- Ring 1 and Ring 2 currents and theirdecay rate
- time

were recorded by these means:

- current chart recording
- alarm printer

3) Results

Current in Ring 1 $\approx$ 4.94 A

" " 2 $\approx$ 2.51 A

Radial bumps in I6 as indicated below.

Pressure in intersection 2 $\approx 4.10^{-9}$ Torr (not good, residue of previous work with high intensity)

The changes of the Septum Magnet currents are of two kinds:

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- "slow" — Δ I main = 20 A in ~ 1 minute
  Δ I corr. = 4 A in ~ 30 seconds
- "fast" — Δ I main = 50 A in ~ 20 seconds
  Δ I corr. = 12 A in ~ 17 seconds

The summary of the results can be shown in this table:

Δ I Septum	Ring 1			Ring 2		
	no bump	bump - 20 mm	bump - 30 mm	no bump	bump - 20 mm	bump - 30 mm
slow	no effect			no effect		
fast	"			"		effect

4) Conclusions

- In normal conditions (no bump or small bumps) we did not notice any bad effect on the beams while changing the septum magnet currents slowly or even rapidly.
- On the other hand with a big bump Ring 2 current became very sensitive to a fast change of septum magnet currents.
- The programme dealing with the correction current as a function of the main current gave satisfactory results.

III. Radial bumps and background

1) Purpose

The physics programme requests the centering of the diamond in intersection I6, and this has so far been obtained by local radial bumps. However, these interact with the background conditions of the rings. It was intended to experiment with different

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recipes of making the stacks and applying the bumps. However, due to lack of time and to the fact that some instrumentation was not operating correctly, it was possible only to collect some qualitative information.

If other ways of centering the diamond (injection farther inwards or displacement of the whole stack) do not become operational after the February start-up, more work will be required on radial bumps.

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