ISR-MA/PJB/GK/cb

12th June 1974

CM-P00071803

ISR PERFORMANCE REPORT

Run 470 - 30 May 1974

Ring 2 - 22 GeV/c

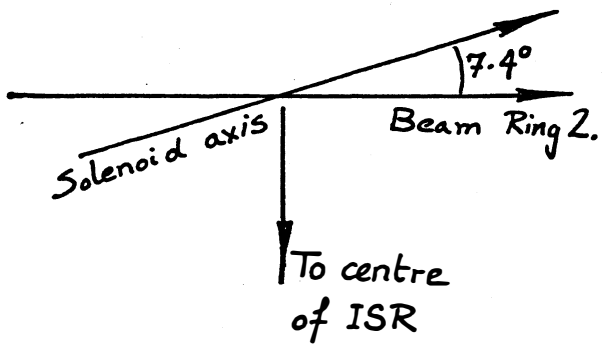
Improved Vertical Closed Orbit Correction for Test Solenoid

Summary

In order to study the long term effects (i.e. several hours) of a solenoid, it has been proposed to power the test solenoid during the latter half of the physics run 479 (12th June). Powering the solenoid when a beam is already circulating is most easily done by aligning the solenoid's axis with the beam as the orbit distortion is then minimal. However, in order to simulate as exactly as possible the action of the final solenoid, it has been decided to rotate the solenoid by 7.4^{o}. This will involve a small disturbance to the beam during ten minutes as the solenoid and its closed orbit correction are excited. Since the physics beams will have been vertically optimised, it is necessary to have a far more accurate vertical orbit correction than has been used with the solenoid during MD periods. This correction has been calculated using H416 and 448 for both the normal and Terwilliger machines.

Normal Machine - 22 GeV/c			Terwilliger Machine - 22 GeV/c		
Solenoid	H416	H448	Solenoid	H416	H448
100 % (1215.6 A)	- 25.72 %	7.4 %	100 % (1215.6 A)	- 23.40 %	8.89 %

For solenoid rotated 7.4^{o} as shown



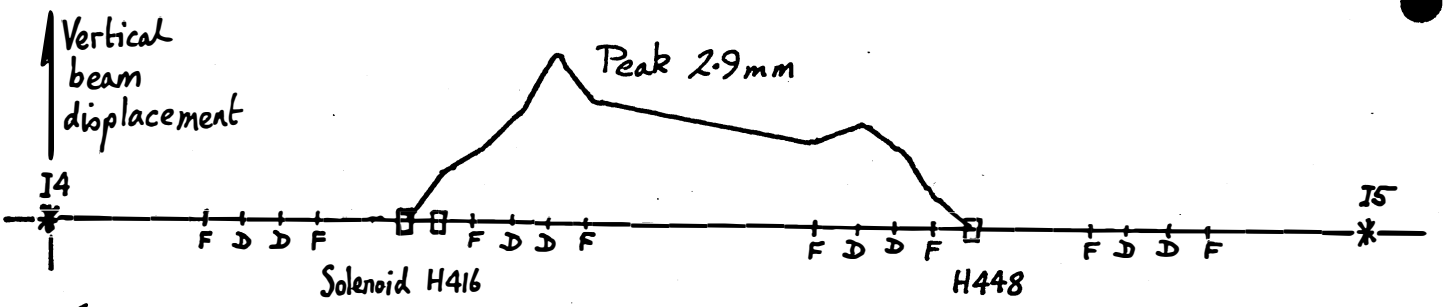
The normal machine correction was checked, but since some Terwilliger quadrupoles had been short-circuited (for tests on machine superperiodicity) it was not possible to check the Terwilliger variant.

Measurements

To avoid the possibility of spurious results from drifting power supplies, all H-magnets were switched off except H416 and H448. The closed orbits were then measured without the solenoid and with the solenoid at 100 % corrected by H416 and H448. The shape of the local bump created is shown in Figure 1 and the theoretical and measured vertical deflections are given for those pickups inside the bump. Table 1 gives the readings of the pickups adjacent to each intersections (averages of 5 readings).

Pickups	860	104	164	204	260	304	364	404	460	504	564	604	660	704	764	800
Without solen.	1.6	2.6	2.7	0.4	1.9	1.8	0.8	0.7	-.3	0.0	0.6	0.6	0.2	3.7	3.6	2.3
With solenoid	1.6	2.6	2.9	0.3	1.9	1.8	0.8	0.6	-.3	0.0	0.7	0.6	0.3	3.6	3.7	2.2
	I1		I2		I4		I4		I5		I6		I7		I8	

Table 1 - Comparison of Pickups Adjacent to Intersections



PU's inside bump	Measured	Theoretical
P 420	2.2 mm	2.202 mm
432	1.9 mm	1.896 mm
444	1.2 mm	1.202 mm

Figure 1

Local Vertical Orbit Distortion due to Solenoid and Compensating Magnets H416 and H448.

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