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Mean radial position variation due to the orbit deformation used for FE 74

The bump coil current pulse was set at two different values:

a) a working value of ~ 122 A

b) a current of 65 A calculated to give a closed orbit deformation of ~ 1 cm in SS 78.

The flat top of the magnetic field was adjusted at 9137 G and as flat as possible. Then the old system for measuring the mean radial position was used on the 18 GeV position with a reference frequency of 9539'893 Hz. For a gate time of 11.52 ms we obtained a correct reading of the position within a tenth of a millimeter. The trigger of this system was adjusted to get a measurement during the maximum of the current pulse.

The following radial positions were read with pick-up stations 78, 87 and 93 and combinations of these.

PU station	Bumpcoil current [A]	Mean radial position 0	65	121.3	RF-Perturb. ext.
78 + 87		103.0 ± 0.3	99.0 ± 0.5	98.2 ± 0.3	ON
78		94.6 ± 0.3	84,9 ± 0.2	76.6 ± 0.3	OFF
87		93.9 ± 0.2	95.7 ± 0.3	98.1 ± 0.4	
87 + 93		95.8 ± 0.2	95.9 ± 0.1	96.1 ± 0.2	
93		97.0 ± 0.2	96.2 ± 0.1	95.2 ± 0.2	

With PU 78 alone in the radial loop we got the calculated beam displacement due to the bump in SS 78 as a shift of the mean radial position.

If we connect PU 78 in parallel with another station in the radial loop, the shift of the mean radial position is about half since the second station counteracts the movement of the mean radial position. See fig. 1 for PU 78 + 87.

PU 87 alone shows a 2 mm displacement of the mean radial position.

The best results were obtained with PU 87 + 93 in the radial loop. We did not even notive a radial error signal (see fig. 2).

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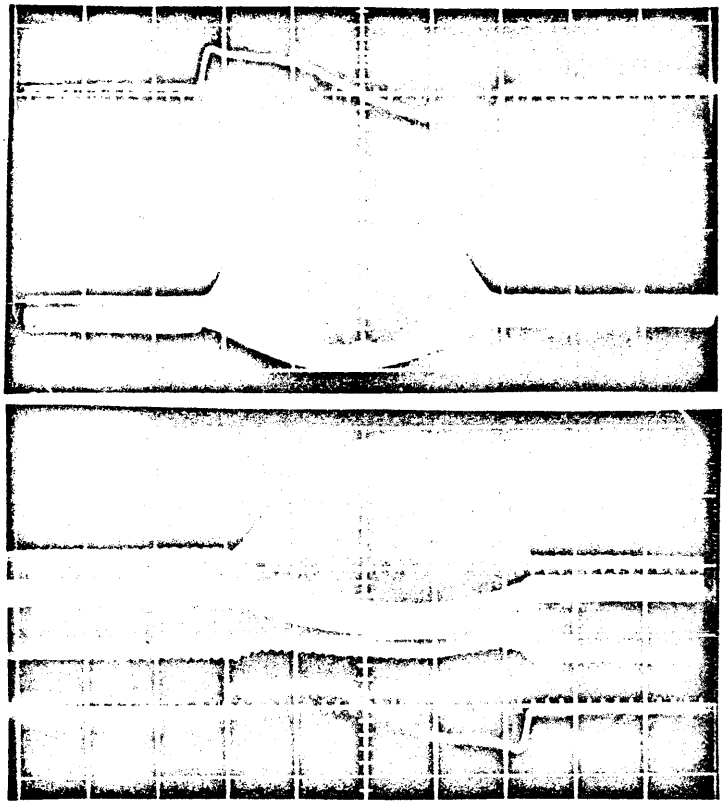

Fig. 1 : PU 78 + 87

Radial error signal
1V/div.

Δ signal PU 87
0.1V/div.

Radial error signal
1V/div.

Δ signal PU 78
0.1V/div

10 ms/div.

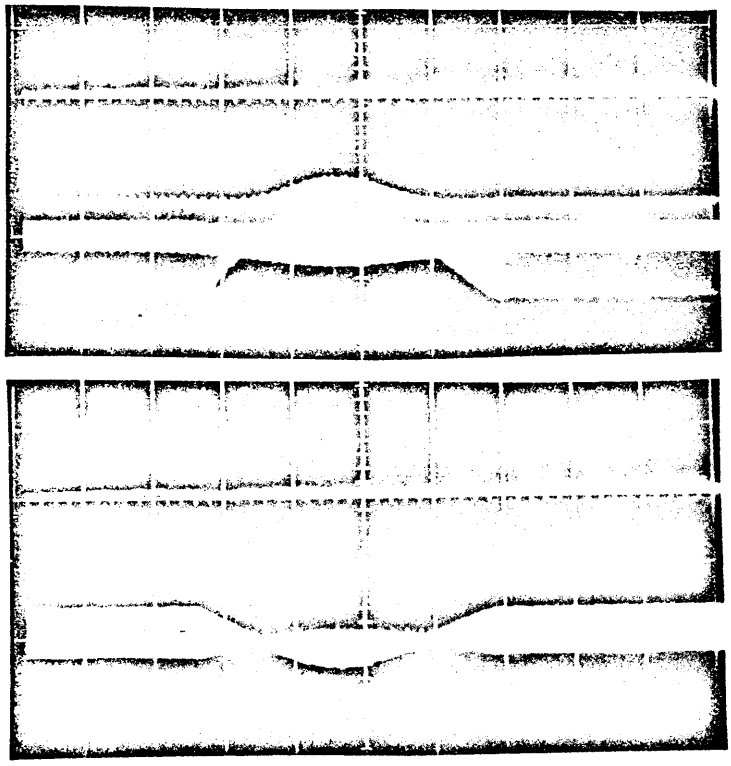

Fig. 2 : PU 87 + 93

Radial error signal
1V/div.

Δ signal PU 87
50mV/div

Radial error signal
1V/div.

Δ signal PU 93
50mV/div.

10 ms/div.