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Half-integer extraction at $Q_H = 26.5$. Observations made during the start-up and the first days of operation after the shut-down of May 1977

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1. Summary

During the May shut-down a new extraction quadrupole was installed in position 3140 and the connections of some extraction octupoles were modified. As expected the extraction losses for a fast half-integer spill at 400 GeV/c were reduced by almost a factor of two with the new scheme and are now comparable with the losses usually observed for slow third-integer extraction. After careful adjustment of the 4 anodes of the electrostatic septum the efficiency of both resonant extractions is higher than 97%.

Depending on the SPS intensity half-integer spills between 400 and 500 bunches were achieved at 400 GeV/c by changing the strengths of the extraction quadrupoles and the extraction magnets. The first spill was observed by the CERN LIBRARIES, GENEVA. The spill was installed in TT60. No intensity variations from one SPS revolution to the next were seen, in opposition to previous observations made for a different scheme and a different extraction method.

2. Extraction scheme and procedure

The extraction quadrupole QE 3140 was excited to a normalized strength of +. 31677 (-155.6A at 400 GeV/c) and the extraction octupoles LOE 1200, LOE 1280, LOE 2200, LOE 2280, LOE 6200 and LOE 6280 were excited to a normalized strength of + 90 m⁻² per octupole (-460 A at 400 GeV/c). These strengths were reached just before the beginning of the flat top.

The protons were brought into resonance by lowering the radial tune Q_H at a high rate during the 60 ms flat top, starting at $Q_H \approx 26.63$.

3. Main observations

Fig. 1 shows the density distribution measured at the electrostatic septum. This distribution should be compared with the distribution measured before the shut-down for the previous half-integer scheme (Fig. 3 of SPS Comm. Report No. 57). The jumps at the septum have become about twice as big, with a corresponding reduction of the proton density at the septum wires.

Fig. 2 shows the fast spill and its high frequency structure observed with the air Cerenkov counter in TT60. As seen particularly well on the two lower photographs, the extracted intensity was practically the same for successive SPS revolutions. This observation is clearly different from what was measured before the shut-down for the previous half-integer scheme and for another extraction method (compare Fig. 9 of SPS Comm. Report No. 60). The only modulation observed this time corresponds to the different CPS turns and to the hole due to injection and to fast "chopping" extraction at 208 GeV/c.

Reported by: K.H. Kissler

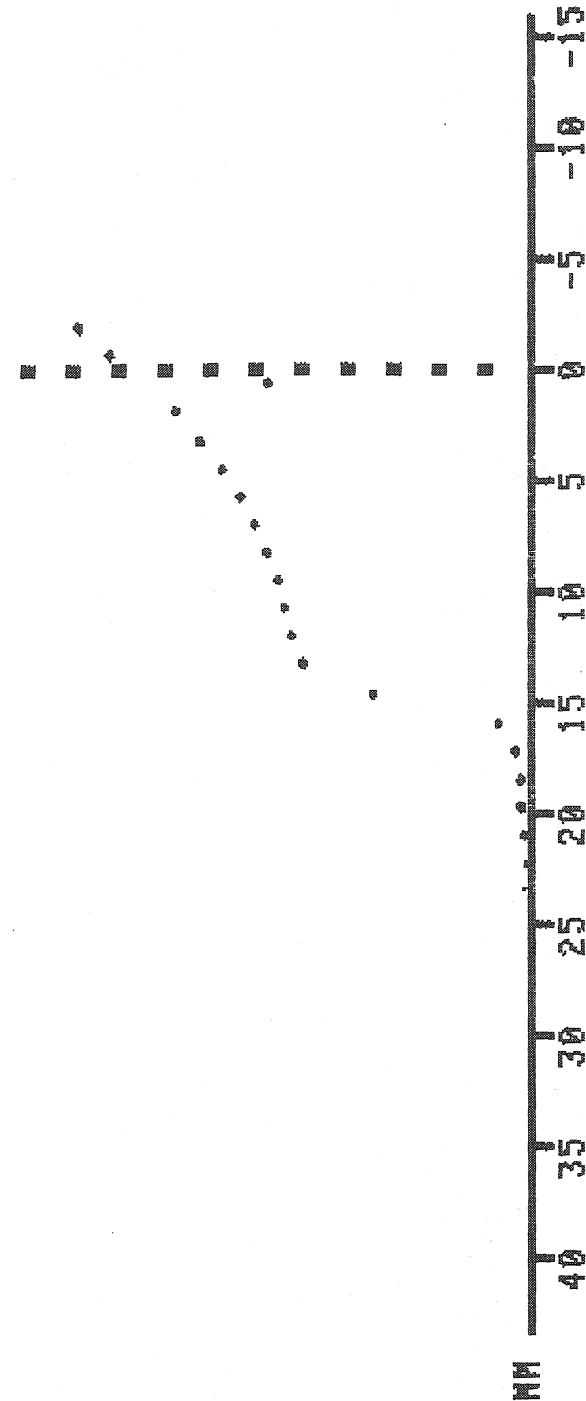
1977-06-20-08:33:50

BBSH 61638

VMAX = 1.47 V

MEASUREMENT TERMINATED

ZS



POSITION

START -2

STOP 23.1

TIMING

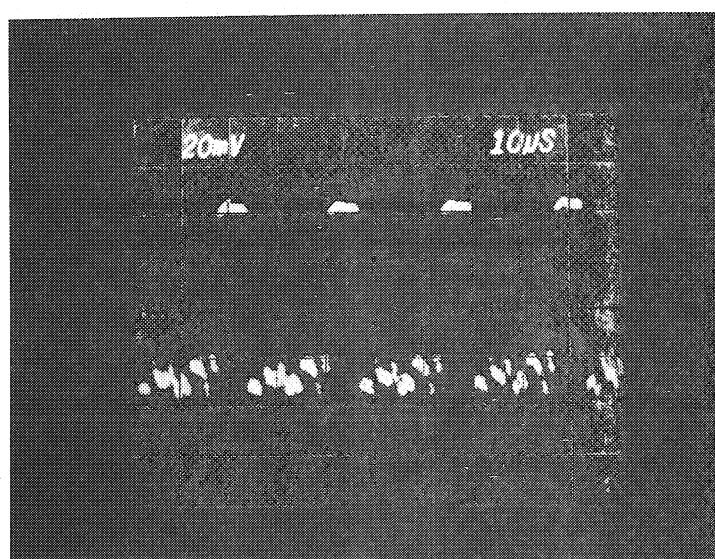
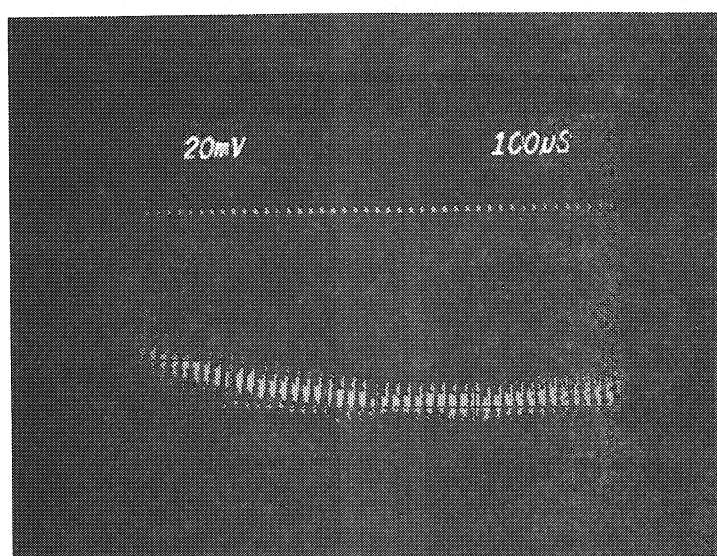
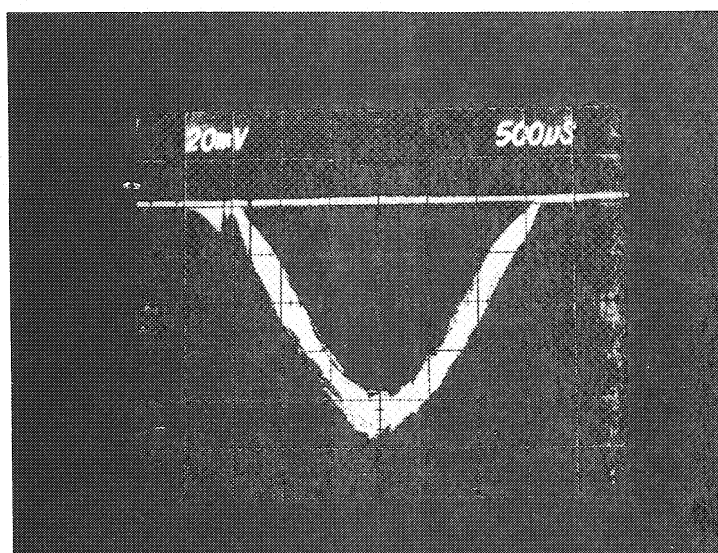
START 3 \ 6300 MS

STOP 4 \ 6420 MS

NO OF STEPS 20

NO OF CYCLES/STEP 1

Fig. 1 Density distribution at the electrostatic septum ZS for fast half-integer extraction.



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Fig. 2 High frequency structure of the fast half-integer spill, observed with an air Cerekov counter in TT60.