

ISR RUNNING-INRun 68 - 9 June 197120 bunches - 26 GeV - Ring 1Stacking at the bottom with intermediate scraping of the tail

The working line was FS26 (see Gourber's report on run 67), with vertical and horizontal closed orbit correction. Pressure on gauge 517.7 was recorded together with beam current.

The PS beam was somewhat weak and erratic, so that the experiment could not be conducted with the desirable stack density.

A stack of 3.0334 A was made with 66 pulses (reduced stacking rate at about 40 pulses: crossing of a resonance giving no loss in Gourber's field scan?). Decay rate less than 10^{-4} min^{-1} . Pressure continued to rise slowly after stacking and levelled, after about 2 min., at 10^{-9} torr.

Scan 2 shows a notch corresponding to the region of lossy stacking.

The stack was scraped from inside to $\langle r \rangle = 10.8$ mm: this reduced the current to 2.6594 A, which was equally stable, and the pressure reduced a little too. Scan 3 shows the suppression of the tail. After scan 3 the current was 2.6371 A, the decay rate $2 \cdot 10^{-5} \text{ min}^{-1}$.

26 pulses were added, reaching 4.0501 A. Decay rate $8 \cdot 10^{-5} \text{ min}^{-1}$. Pressure kept rising after stacking, reaching $4 \cdot 10^{-9}$ torr. Scan 4 was made. Then inside scraping to $\langle r \rangle = 4.7$ mm, reduced current to 3.7048 A and pressure decreased a little. Decay rate $8 \cdot 10^{-5} \text{ min}^{-1}$ during 4 minutes. Scan 5 shows the suppression of the tail due to scraping.

At this point, the accidental insertion of 18 empty pulses diluted the stack, thus obscuring the interpretation of the experiment.

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23 more pulses were added, reaching 4.3087 A with a total of 133 pulses. Pressure rose to $1.6 \cdot 10^{-8}$ well after end of stacking. Decay rate higher than before, but less than 10^{-3} min^{-1} . Scan 6. Then stack scraped to $\langle r \rangle = -6.4 \text{ mm}$, with reduction to 4.09 A, and decrease of pressure, which continued after the scraping during 2 minutes and brought it well below 10^{-8} torr., still heading downwards relentlessly.

Both pressure variations and lifetime seem to show the existence of a threshold above 4 A.

After dumping the beam, a second stack was made with only short stops for scraping. The record is as follows:

- 3.0060 A in 63 pulses
- scraping to $\langle r \rangle = 11 \text{ mm}$ reduced current to 2.7361 A
- 4.0000 A in 83 pulses
- scraping to $\langle r \rangle = 5.9 \text{ mm}$ reduced current to 3.8245 A
(pressure in 517.7 reached $7 \cdot 10^{-9}$ torr.)
- 4.6 A by 14 additional pulses. Pressure started rising faster and faster and at 4.6 A sudden stacking downwards occurred, accompanied by BW-type signals at filter output. Maximum rate of pressure rise 8% sec^{-1} at $2.5 \cdot 10^{-8}$ torr., having 4.5 A current. Remembering from the previous stack that at 4.25 A the pressure tended to level off towards $2 \cdot 10^{-8}$ torr., the impression of the existence of a threshold a little above 4 A is confirmed.
- At 3.7 A level scan 7 was made: this shows that the loss has occurred mainly near the top of the stack.
- One of the "mystery" fast falls occurred a minute later: the current jumped down to 3.06 A. Scan 8, made immediately afterwards, shows that the loss has occurred in the central part of the stack.

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Fig. 1

scm 10-6.4

scm 6

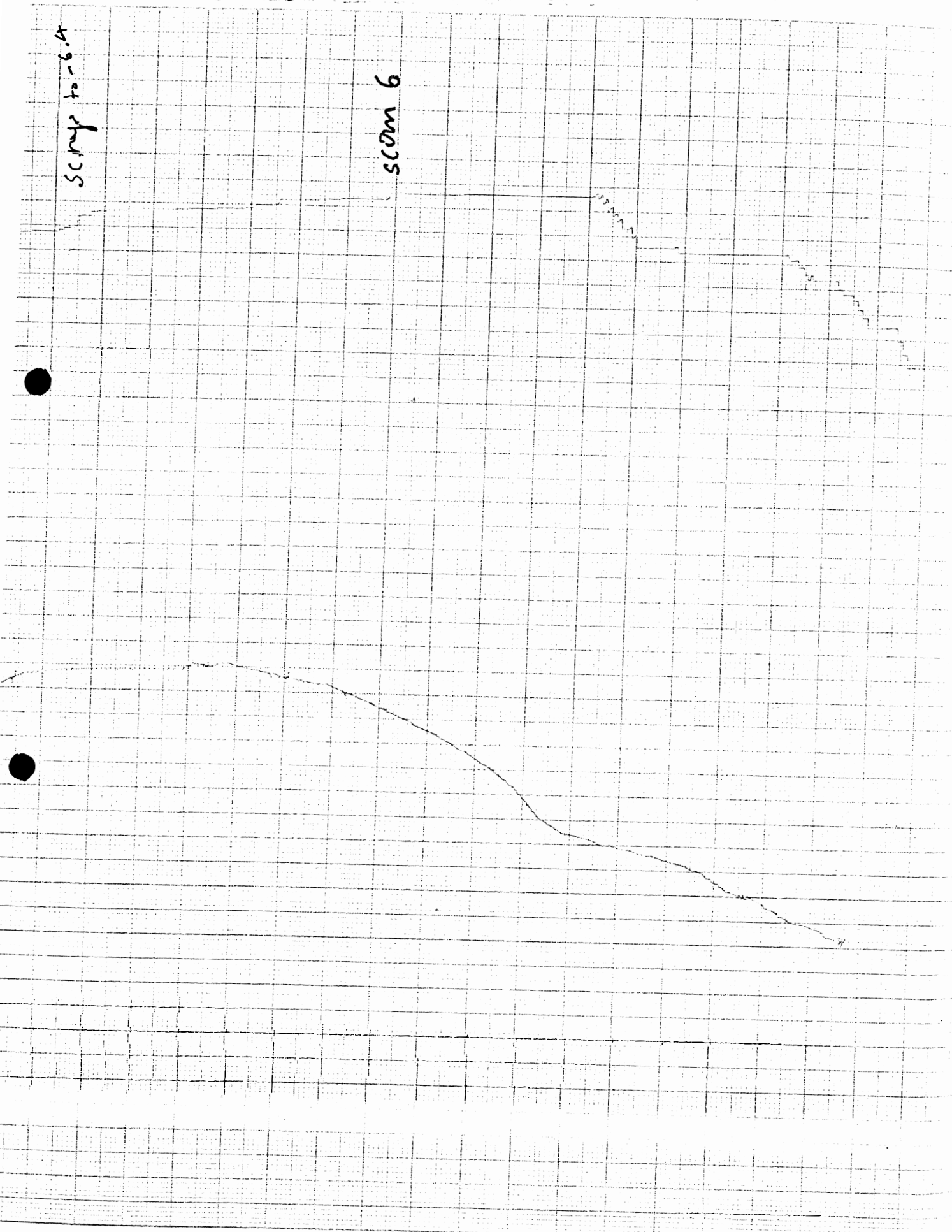
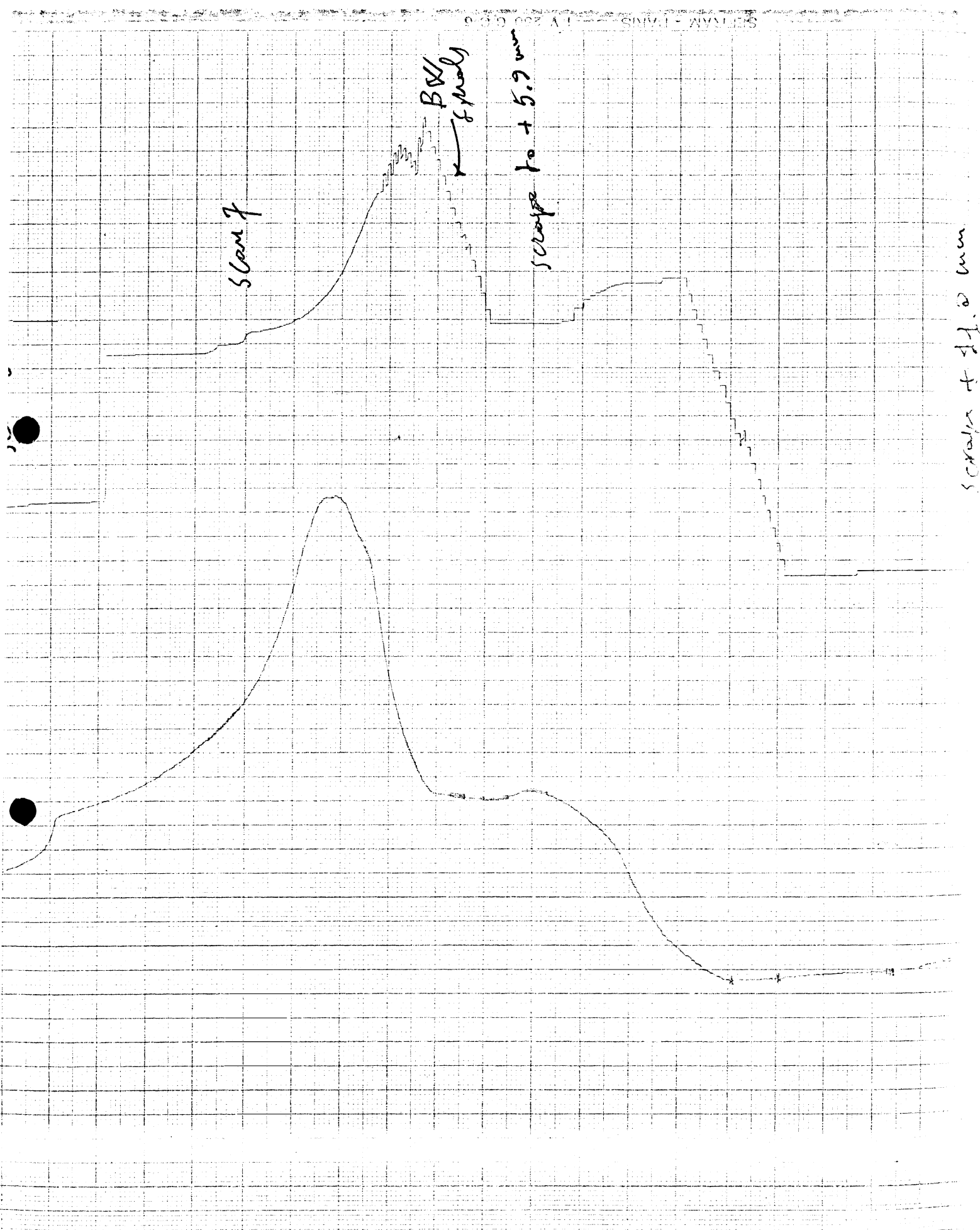
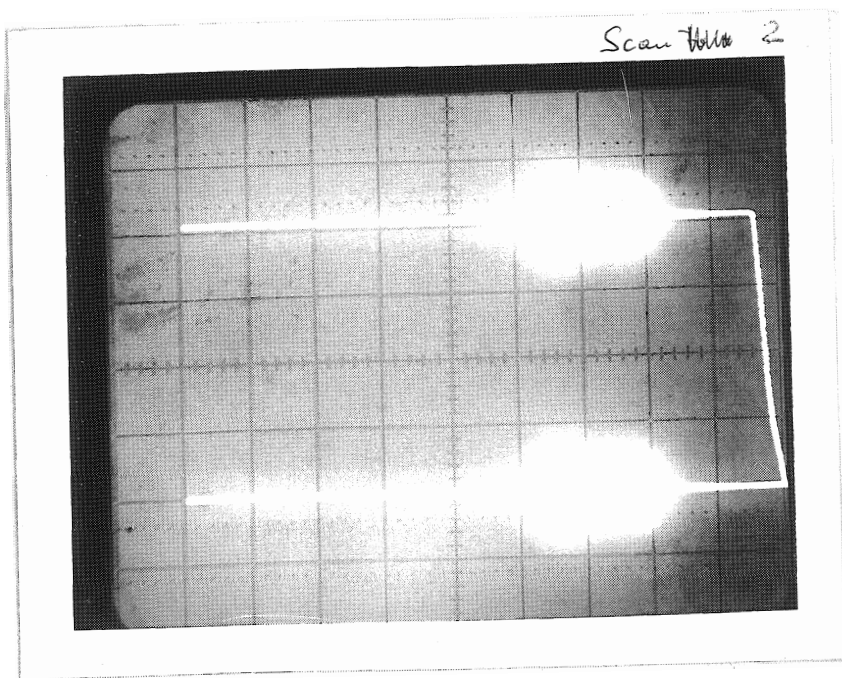
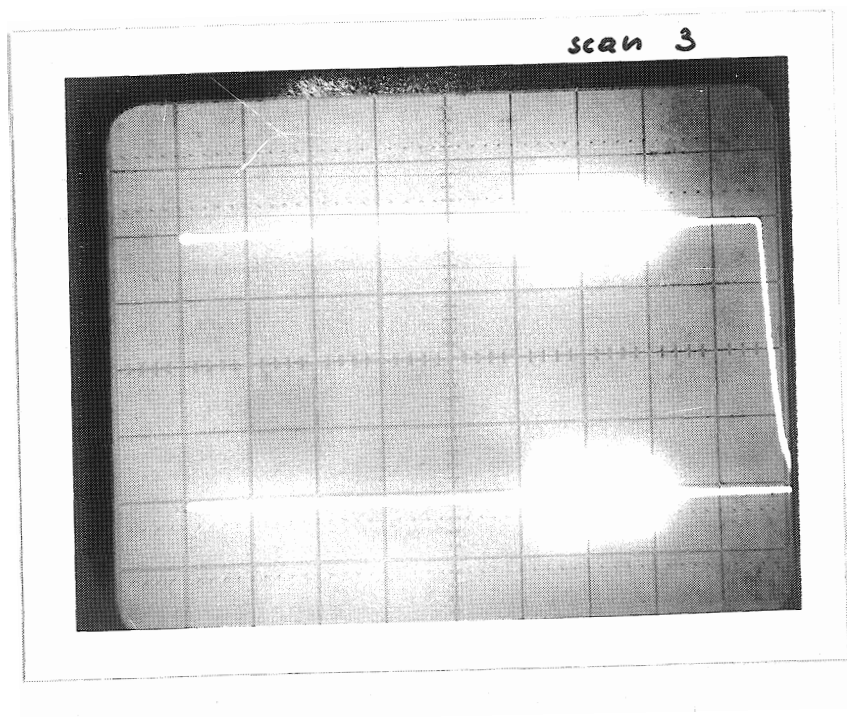


Fig. 2

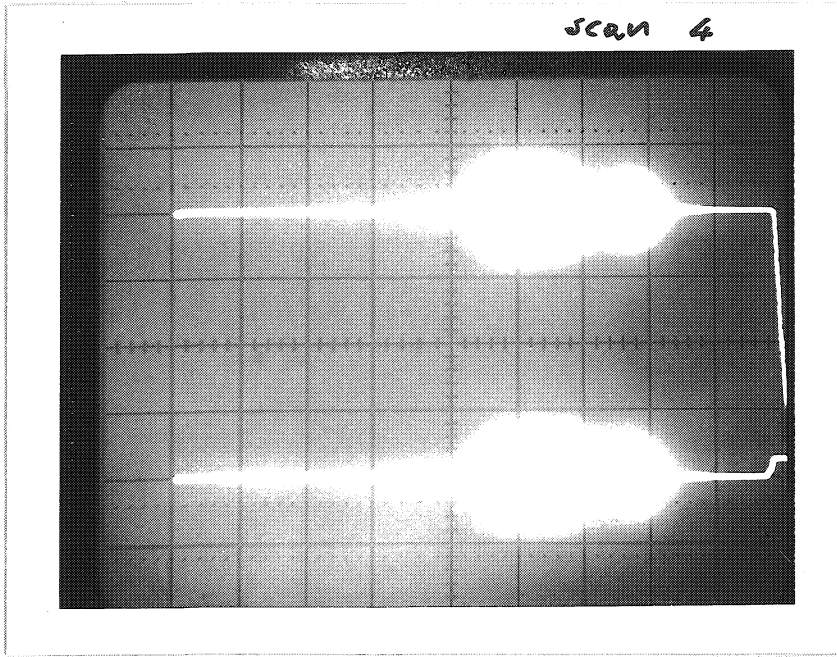




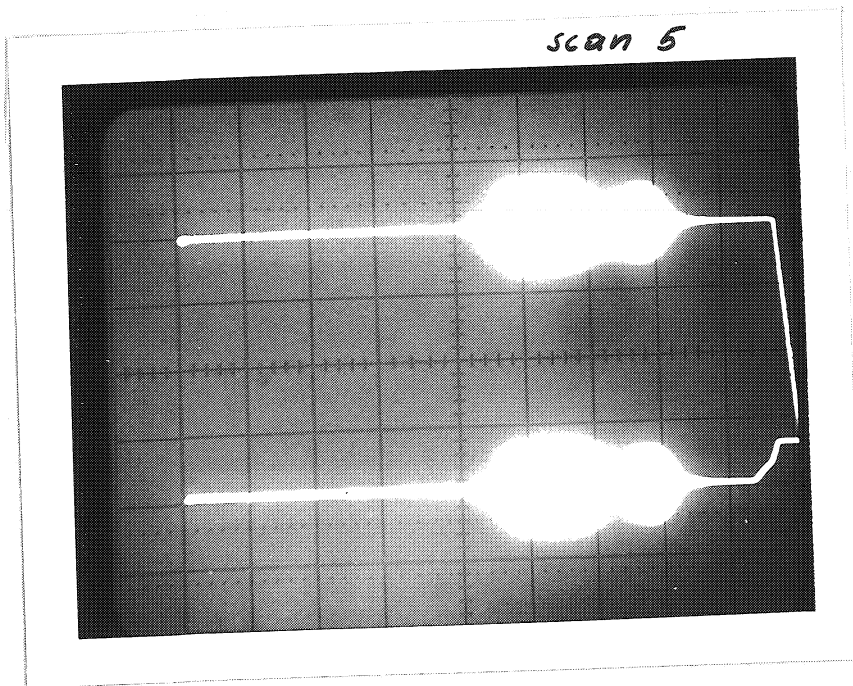
Scan 2



Scan 3

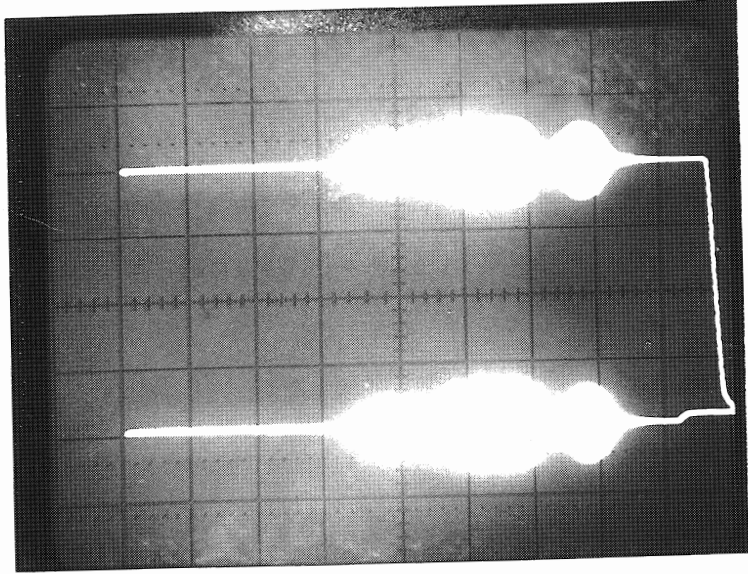


Scan 4



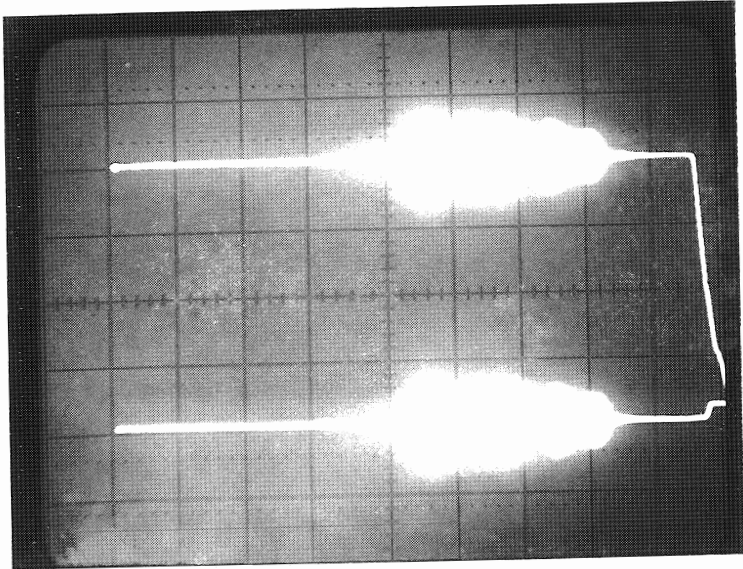
Scan 5

scan 6



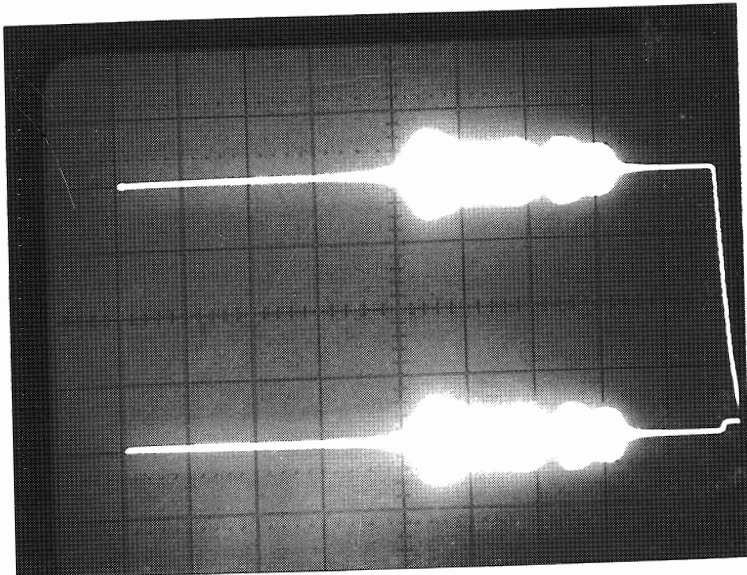
Scan 6

scan 7



Scan 7

scan 8



Scan 8