ISR-RF/ls
17th August, 1971

Please replace the first page of the Running-In report
"Parasitic experiments on Q-shift in stack", of 16th
August, by W. Schnell, by the attached corrected version.

Thank you

ISR Group Leaders
Running In Committee
Engineers in charge
RF Group
E. Brouzet MPS
M. Höfert HP

ISR RUNNING-IN

Run 99, 20 bunches, 22 GeV, Ring 2.
Parasitic experiments on Q-shift in stack

54.5 Hz/mm with r.f. acceleration

560 Hz/V on frequency analogue voltage

1 "HP cm"/V on r.f. scan i.e., 1.025 "HP cm"/real cm.

The original 22 FA working line was shifted by $\Delta Q_H = -0.02$, $\Delta Q_V = +0.035$. The resulting line (measured with r.f. beam displacement) is shown in Fig. 1. Third order resonances occur at + 25.3 mm and at + 36.3 mm. These two resonances can be clearly seen on the aperture scan Fig. 2 (with the frequency analogue voltage as abscissa). What was less easy, was to identify these resonances (or one of them) in the r.f. scans of stacks.

Fig. 3 shows r.f. scans of a series of stacks of different density and current. If one believed that the two dips marked on the photographs were the same pair of resonances all through (?) one would find that they have the same position in stack 2, 3, 4 (as one would expect), and almost the same in stack 5, but that the lower one has shifted inwards in radius by 3 mm in stack 6 and by 4.5 mm in stack 7, and that the upper one has shifted outwards by 1.5 mm in stack 6 and completely out of the stack in stack 7. Assuming further that the upper dip is the $Q_V = 8^2/3$ resonance (?), the 1.5 mm outwards shift would correspond roughly to $\Delta Q_V = -0.003$ (for the 1.8 A of stack 6).

On the other hand, if one compares (Fig. 4) stack 6 with stack 8, which is again at the lowest density but which has been moved by ± 2 mm with the magnetic scanner to widen the dip, hypothetically due to $Q_V = 8^2/3$, one finds no measurable Q-shift. The lower dip of stack 8 is unexplained.

The experiment should be repeated under better conditions. Perhaps one should start with 4 bunches which gives clean r.f. scans for clean