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E-6

CM-P00071516

ISR PERFORMANCE REPORT

RUN 300, 12th April 1973

R2, 22 GeV/c, 20 bunches

Effect of the experimental cavity on bunched beams

The experimental cavity can be used to check Sacherer's <sup>1)</sup> stability criterion for bunched beams (as proposed by B. Zotter). This cavity can be tuned to 56.89 MHz ( $k = 179$ ) where it is expected to excite the dipole ( $m = 1$ ) and quadrupole mode ( $m = 2$ ) of a bunch in a stationary bucket of 16 kV. Due to lack of time, only one short experiment was carried out. The figure shows the bunches first with the damped cavity and then without damping  $-\frac{Z}{k} \sim 1000\Omega$ . According to Sacherer, the undamped cavity should produce an instability with a rise time of  $< 10$  ms. The measurement shows  $m = 1, 2$  and higher modes growing very fast and filling the bucket in a rather short time. More measurements will be necessary to get quantitative results.

P. Bramham

K. Hübner

A. Hofmann

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1) F. Sacherer; A Longitudinal Stability Criterion for Bunched Beams, CERN/MPS/Int-BR/73-3.

$V=16\text{ kV}, \Gamma=0$

0.04 sec  
after inj.

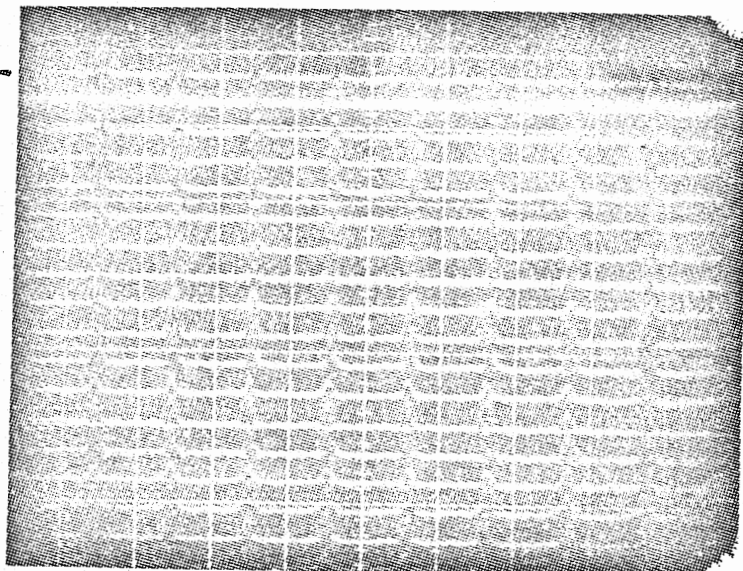
Cavity damped

50

100

ms

$\downarrow t$



Cavity undamped

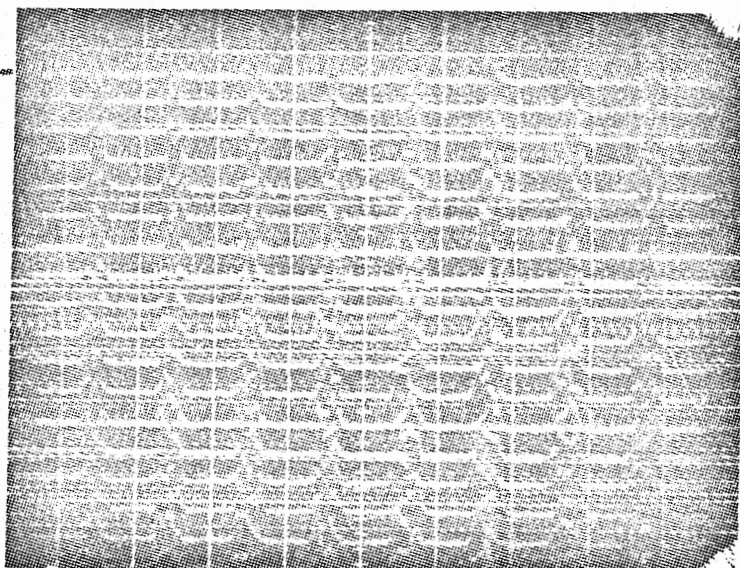
0.04 sec

50

100

ms

$\downarrow t$



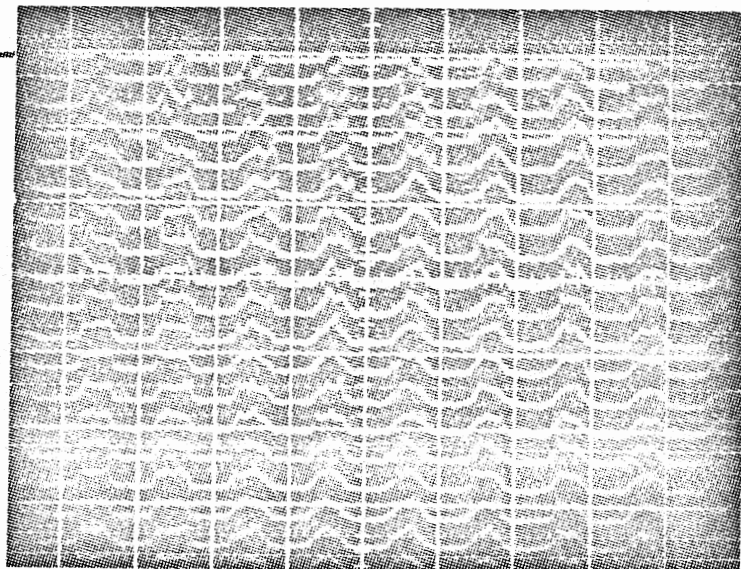
0.3 sec

50

100

ms

$\downarrow t$



mag. Q

100  $\mu\text{V}/(3000)$