

THE NEW BEAM TICKLERS

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AGS DIVISION TECHNICAL NOTE

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For the past several years horizontal and vertical betatron frequencies at low energies and vertical frequencies at high energies have been measured using the rf knock-out technique. Excitation of the coherent modes $n = 8, 9, 10$ was achieved by driving coils located in the H10 10 ft straight section at one of the frequencies $|n-\nu|f_0$ for periods of one or two milliseconds. The coherent oscillation build-up was observed on a pick-up electrode difference signal and the frequency producing maximum amplitude recorded. Vertical coherence could always be produced even at 25 BeV with a pair of two turn coils while horizontal coherence even with five turn coils was difficult to observe at these energies. This is due to the fact that the ν_x vs $\Delta\bar{r}$ (or $\Delta\bar{p}$) is generally quite steep at these energies while vertically it is almost flat.

An alternate scheme has been developed to measure ν_x and now also ν_y at high energies.¹ However, it cannot be used satisfactorily at low energies since the minimum orbit bump available is too large relative to the beam size and machine aperture. Thus there remains a need for rf knock-out apparatus. Since the H10 coils have been recently removed to make way for new fast beam extraction equipment, an alternate system had to be developed as there was no 10 ft straight section available for these coils. Fortunately, a special 5 ft straight section containing two sets of four electrodes was available, (drawing D06M-615-4). This had been used to try and excite and observe quadrupole resonances in the beam. The electrodes and their supports have been cut down so that the free aperture is now 6 in. rather than the 4.5 in. shown in the drawing.

This assembly and its chamber (D05-M-778-4) has been installed in the downstream half of the E20 10 ft straight section. The upstream electrodes which are 18 in. long are now driven as dipoles to give horizontal and vertical deflections at the frequencies $|n-\nu|f_0$. For the vertical plates a pair of 807's in push pull with a so-called ultra linear output transformer connection provide a 1 kV peak drive over a 3 db bandwidth of 25 kc to 120 kc (capacity of a single plate plus cable $\approx 100 \mu\mu\text{f}$). For the horizontal plates a pair of 4-400-A's giving a 2.5 kV peak signal over a bandwidth of 17 kc to 90 kc are used. The 807 circuit had been used to drive the electrodes in the quadrupole configuration while the 4-400-A circuit with a different output transformer was the driver for the H10 coils.

The vertical tickler provides adequate excitation up to 90 msec after injection (i.e., $\approx 150 \text{ ms}$ from t_0) while the horizontal tickler has yet to be tested. It is hoped that the factor of 2.5 in available drive will prove adequate over the same range of energies. (The 1 kV excitation being just barely adequate at injection.) Since the ν vs $\Delta\bar{r}$ is about the same for both horizontal and vertical motion, the lack of horizontal build-up is most likely related to beam size.

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AGS DIVISION TECHNICAL NOTE

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J. Guthy, J. Glenn, G.W. Bennett
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G-10 90° MONITOR TELESCOPE

This note updates AGS Tech Note No. 89 dated January 14, 1972.

The G-10 monitor telescope has been replated and recalibrated. We now read 1878 counts per 10^{12} protons. The high voltages are:

HVA = 2100

HVB = 1850

HVC = 2050

The change is partly due to recalibration of the circulating beam intensity monitor, aging and changes in temperature.

We expect to have this monitor recalibrated periodically.

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