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Triple Switch Phase Jump at Transition

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Purpose: To try out the triple switch phase jump scheme at transition and determine if it will improve the mismatching of the bunch shape present at high intensity.

Preparation: A fast phase shifter card was installed and 10 kc predet was obtained for the timing. Provision was also made to clamp the radial error signal to zero level for up to 4 msec.

Procedure: The amplitude of the phase jump was adjusted so that when the radial error signal was unclamped there was essentially no offset. Values of 72°-79° were obtained depending upon the timing of the phase jump. The radial error signal was clamped at the time of the first jump or within one msec of this time.

Results: No significant improvement in matching was obtained with several combinations of switch timing and jump amplitude. Typical times were 1.9 msec between 1 and 2 and 1msec between 2 and 3. The beam intensity was 3.5-4 $\times 10^{12}$. The peak detected signal from a 50 MHz. PUE system after transition was at best one half its value at transition.

One significant additional observation was made. Using only a single phase jump of less than one half the correct value, passage through transition occurred on some pulses with a much better match than normally obtained, i.e., the peak detected signal would be $\approx$ 66% of its transition value. This occurred at levels of 3.7 $\times 10^{12}$. On some pulses a small but definite beam loss was seen later on during the acceleration cycle. These events were so rare that it was not possible to determine what form of instability was present. Thus if one can obtain an increased longitudinal density after transition a new intensity limitation will most likely confront us. Finally, it is planned to try the triple switch scheme at least one more time with a still faster phase jump than was available on the above dates, i.e., $\approx$ 50 μsec in either direction versus $\approx$ 200 μsec forward and 400 μsec return.