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# Simulation Result Phase Jump Mistiming

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# Simulation Result of Phase Jump Mistiming

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Since the transition jump quads will not be ready until November, in the run of May to July, the timing of the RF phase jump is critical in the transition crossing.

Simulation result of the beam loss for different mis-timings of the RF phase jump without $\gamma_T$ jump is obtained by TIBETAN.

Parameters of the run:

RF peak voltage is 300000 V. Phase $\phi = 0.1585 = 9.086°$, so the energy gain $\Delta\gamma$ for one turn is $2.04 \times 10^{-5}$, time for one turn is $1.28 \times 10^{-5} sec$, so the $d\gamma/dt = 1.6 s^{-1}$.

In the simulation the total number of maroc particles is 2000. Initial bunch has a gaussian distribution in the momentum.

Simulation result shows that at the 'correct' phase jump time when $\gamma$ is exact nominal value, the crossing transition is 81 percent. But if phase jump time is ahead of the 'correct' time a little bit, say 3-5 ms, it will give a larger crossing transition efficiency.

In the mistiming range of -10 to +5 ms, the crossing efficiency can reach above 80 percent.

Simulation results is shown in the following table and graph:

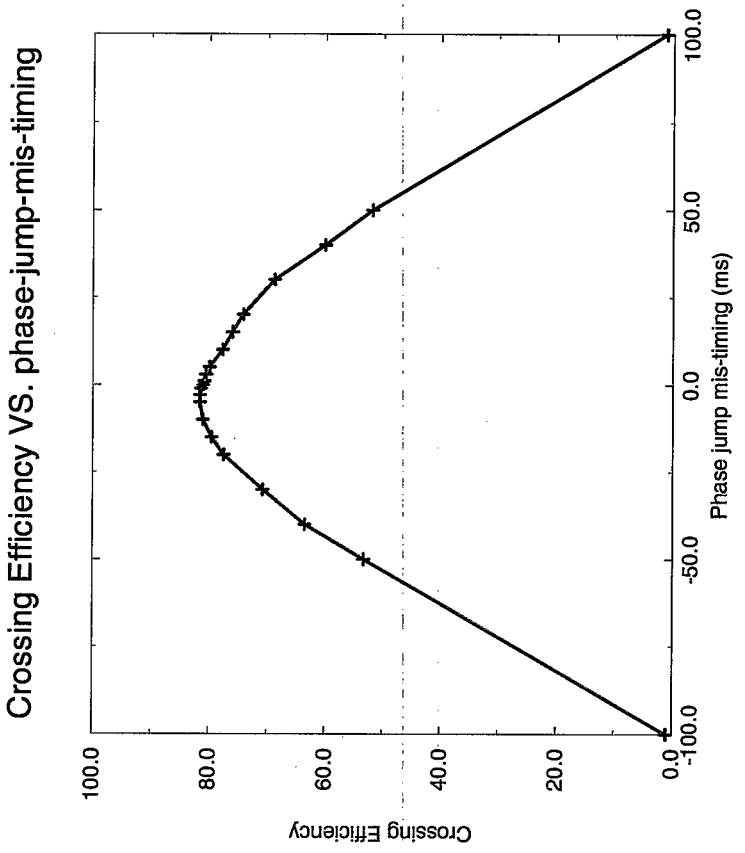


Figure 1: Crossing efficiency at different RF jump mis-timing.

Table 1: Crossing efficiency at different phase jump time

| Delay time of RF jump (ms) | Crossing effeciency(%) |
|---|---|
| -100 | 1.1 |
| -50 | 53.3 |
| -40 | 63.5 |
| -30 | 70.7 |
| -20 | 77.5 |
| -15 | 79.6 |
| -10 | 81.1 |
| -5 | 81.6 |
| -3 | 81.6 |
| -1 | 81.4 |
| 0 | 81.0 |
| 1 | 80.8 |
| 3 | 80.5 |
| 5 | 79.9 |
| 10 | 77.7 |
| 15 | 76.0 |
| 20 | 74.1 |
| 30 | 68.7 |
| 40 | 60.0 |
| 50 | 51.9 |
| 100 | 1.2 |