Notes from MI/RR Meeting - 29 Jan 2003
by Bruce Brown
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Progress on MI BLT - Vic Scarpine

Recent Tevatron Shots have shown problems with the MI-BLT response on pbar injections. Vic explored the problem by examining details of the response given by the AM-PM BPM electronics and also digitizing the A and B output with a fast digital scope to try to separate beam and instrumentation effects.

For each transfer, 4 - 2.5 MHz structures are exhibited by a modulation of the filling for 7-53 MHz bunches. These structures are coalesced into 4 - 53 MHz bunches at 150 GeV. Looking first at the response to the 4 structures in a batch, one sees that the Horizontal and Vertical AM-PM outputs are not precisely in time. One of the symptoms of the recent problems is an apparent 'synchrotron' oscillation in the vertical signal. Changing the timing for sampling where one reads position from this waveform results in the 'synchrotron' oscillation appearing in both horizontal and vertical, suggesting that it is a result of the ringing of the AM-PM signal (remember that these were designed to record position for a filled batch of 84 bunches). Comparing the 4 responses, we see that for the horizontal response, the first differs from the typical response of the other three. Closure is accomplished using the second of these responses. For the vertical signal, the first response is not so different. By choosing a different sampling time, the objectionable response for the last few shots before the shutdown can be improved.

Further studies were carried out by replacing the AM-PM modules with a fast digital oscilloscope which recorded the A and the B outputs. This system was able to create clean signals for each of the 7 53 MHz bunches in train and similarly produce clean results for the 4 trains in a batch. Using simple algorithms to create a position signal, it was possible to track oscillations and compare the responses for the center bunch and bunches +2 and -2 from that center bunch. Note that this technique is similar to the digital receiver cards being studied for RR BPM's but those cards do not have sufficient time resolution to resolve the 53 MHz signals.

After the shutdown, the BLT system needs to have the BPM timing adjusted. That should be done with 2-4 shots to the Tevatron. Also 2.5 MHz BLT for the RR died at the end of the run and will need to be revived.

MI BPM Proposal - Brajesh Choudhary

In response to the long term requirement to replace the Main Injector BPM system, a requirements document is being prepared. Brajesh reviewed it in detail, receiving many contributions. Several individuals were identified to assist with specific portions of the document.

Status and Plans

The shutdown is progressing about on schedule. Beam to the Main Injector expected on Sunday, Feb 2. The startup goal is to put beam (of any quality) through each accelerator/beamline in the system as soon as possible. Important changes include the power supply for Q847 (all quads at end of MI8 Line), many power supplies in P1 and A1. The MI8 line is also impacted by the installation of a new MP02 Booster Extraction Septum.