LINAC-PSB INJECTION LINE.   STEERING

When the linac beam is handed over for PSB operation, it should be pos-sible to monitor the beam quality in the MCR.

In particular the beam should be centered in the position monitor I-U4. Last week we observed the position of the beam as given by slits I-SLIT 1,2 and position monitors I-U2, 4 and in the measuring lines where the position is defined by the measuring slits. Discrepancies of about 2 to 5 mm were noticed. The drawings for the slits and position monitors together with their alignment fixtures are being checked for any possible built-in errors.

The following procedure for steering the beam to I-U4 was devised. It is similar to the current instructions but also involves I-U4. At present, the signals for this station are available only in the MCR on the injection line analogue multiplexer. A cable is to be made available to pass these signals to the LCP. This is only a short-term solution, the signals from I-U4 will eventually be sent to the LCP as well as the BECR as at present.

For the moment setting the steering to I-U4 will require a person in the MCR to select the required I-U4 signal in the multiplexer.

The following instructions are given for the horizontal plane and are the same as for the vertical plane if the corresponding steering magnets and position observations are used.

1) Center the beam in I-U2 using DH1 and DH2. If possible use only DH1 with DH2 set to zero current (500 on the helipot). If there is any apparent change in the steering over the pulse (difference signal positive amd negative at different times during the pulse) a decision has to be taken as to the time for which the position is zeroed or one can choose to minimize the absolute value of the signal. The sensitivity of the po-sition monitor can vary along the pulse and from pulse to pulse, and seems to depend critically on the beam quality (for instance the bunch length and hence the monitor response would be greatly affected by a large energy error for a sufficiently large part of the beam). However a rough can be made at any time; changing the helipot for DH2 by 100 divisions

should shift the beam by 4 mm.

2) Put the beam in the emittance line and observe the mean position of the beam. It is desirable to utilize the computer display where this value is given in the column headed RMN. Use DH3 to set this value to zero. DH5,4 should be set to zero current (500 on helipot) for this step.

3) Request that the signal from I-U4H be selected in the MCR and connected to the cable going to the LCP. Make this signal zero (as for I-U2) with DH4.

Note : The sensitivity of I-U4 is much smaller than I-U2. It can be checked with DH4 which gives a change of 25 mm for a helipot change of 500.

It should be noted that if the emittance line is now used, the display may be found to be off center by 3-5 mm. Also the current passing through the spectrometer slit will be reduced (a 30% reduction was noted). If DHV4 is altered to avoid these effects, it should be returned to the value determined after step 3 above.

The above method does not ensure that the beam is on axis in the quadrupoles IQ1 to 6 , so should these be altered then steps 1-3 must be repeated. Changes in tank levels and IQ11 and 21 will also affect the steering. Even changes in tank levels for the PS pulse may give steering changes (via the phase servos). Note that the PS operators may change tank levels and IQ11 or 12 at any time.

In addition to getting the I-U4 signals permanently at the LCP and have agreement between slit and monitors for position, it would be an advantage to have I-U1 installec   lanned, ac as to make it unnecessary to divert the beam into the emittance line.

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