

SPS Beams for LHC: RF Beam Control to Minimize Rephasing in the SPS,
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D. STELLFELD, U. WEHRLE, CERN - After acceleration to 450 GeV/c in the CERN SPS, the proton beams for the LHC must be rephased in order to be injected into the correct place in the collider. If the position before rephasing is random, the beam must be rotated by up to 1/14 SPS turn. This procedure will take about 330 ms on the flat top. Besides lengthening the cycle, the beam may deteriorate if instabilities develop during this long process. We propose a beam control system that reduces the rotation angle needed. We first synchronize the transfer at injection into the SPS onto the LHC reference so that, after ramping, the SPS beam will be very close to the required position for transfer to LHC. For this prediction of the final position to be valid the beam is accelerated with the combination of two low level RF loops: the usual phase loop (at 200 MHz) to damp phase oscillations and a synchro loop to keep the beam frequency locked to the frequency program during acceleration. This frequency program is derived from the main dipole field, and the only source of longitudinal position error is thus due to the fluctuation of this field. Details of the design are given together with results of the first tests with beam.