Week 30 (parallel + floating MD)

Emittance growth studies in coast at 270 GeV/c (R. Calaga, E. Métral, R. Tomás, J. Tuckmantel, F. Zimmermann)

The study was conducted with a single bunch at low intensity (~2 x 10^{10} p) coasted at 270 GeV/c with the nominal SPS optics. The option of coasting a beam on a Q20 cycle could not be available at this date, because the time devoted to the coast set up (nominal optics and Q20@270 GeV/c), initially scheduled to span over 8 hours, was reduced to only less than 2 hours due to the LHC beam request. This made it possible to set up correctly the coasting beam at 270 GeV/c with the SPS nominal optics, but coasting with Q20 was not attempted.

However, the emittance evolution could be studied over two long coasts at 270 GeV/c on nominal optics (the first one lasted a couple of hours, the second one more than 5 hours), showing an emittance blow up of 20 to 30% per hour also at this high energy. Results at 120 GeV/c and for higher bunch currents were not much different, suggesting that the origin of this emittance growth probably does not depend directly on the beam properties.

Tune shift and instability measurements with intense single bunch on Q20 optics (H. Bartosik, Y. Papaphilippou)

The single bunch with intensity up to 4 x 10^{11} p was injected into the SPS on a MD1 cycle with Q20 optics and measurements of tune shift versus intensity were carried out to estimate the transverse impedance and compare with data from previous years (and this year) on nominal optics. A clear instability excited by the small kick of the Q-meter was observed for injected intensities between 3.2 and 3.5 x 10^{11} p, suggesting the occurrence of mode coupling-decoupling, as predicted by theory with the SPS impedance model. The details of this instability will be analyzed off line.