Performance Reach of LHC Beams in the PSB (B. Mikulec)

• Emittance/Intensity along the injection chain:
  • LHC Ultimate beam achievable if blow-up along injection chain less as 20%.
  • LBS/LBE will be recalibrated to have more accurate value of the L2 emittance \( m \) (about 1.2 um), however it seems that there is no emittance blow up in PSB.
  • The curve of intensity Vs emittance depends on the longitudinal emittance.

• PSB
  • Possible discrepancy between the 4 rings (as beginning 2012) not to be forgotten. In case 1 ring has low performance, the scheme 3+3 can be still be used.
  • Injection optics of the PSB can be already studied.

• L4 needed for HL-LIU goals:
  • No MD can be done yet, except for Tune Shift with the high intensity at 160 MeV (see A. Molodozhentsev).
Space charge studies at 160MeV in the CERN PS Booster (A.Molodozhentsev)

• PTC-ORBIT benchmarking:
  • Linear coupling: Simulation with random error on the Quads gradient did not show excitement of the linear coupling.
  • The Quads gradient errors in the machine can be estimated measuring the beta beating using the orbit corrector and PUs. A Tool developed for LHC is now being deployed for the injectors.

• Extreme Space Charge at 160 MeV
  • First MD with 'extreme' space charge detuning at the 160MeV energy indicates promising possibility to reach the space charge detuning of (V: -0.4) with limited emittance blow-up and acceptable particle losses.

• Simulation could provide a threshold for the minimal L4 emittance
• Different Painting schemes are under study
• Only RMS Emittance were studied from the simulation but it is possible to study the halo too.
PSB RF & Transverse Feedback Aspects (A. Findlay)

• Transverse Damper
  • For injection and instabilities oscillations.
  • The beam stability with higher intensity beam with the parameters of the new Damper has to be study further. Transverse Damper system designed for a bandwidth of 20MHz, the power amplifiers have a range of 10kHz to 100MHz.

• Finemet Cavity
  • when a decision can be made?

• Digital RF control
  • would strongly benefit from MDs in 2013