

LIU, ABP-CWG, PBC, miscellaneous

ABP-HSC Section meeting, 11.12.2017

<https://indico.cern.ch/event/686642/>

LIU (LHC Injectors Upgrade)

- LIU SPS injection beam losses review on 30 November and wrap up presented by B. Goddard last Friday ([link](#))
- Important progress on understanding of the mechanisms:
 - There are four main problems linked by longitudinal emittance at transfer
 - CB instabilities in the PS
 - Uncontrolled longitudinal emittance blow up along batch in PS
 - Fast capture losses in the SPS
 - Slow losses on injection plateau in the SPS
 - PS: Important role played by bunch shape in longitudinal phase space from bunch splitting and bunch rotation in SPS (tails)
 - SPS, problems identified in
 - Present LLRF (beam and cavity control)
 - Leak/loss of particles close to separatrix (due to bucket area shrink e.g. for intensity effects or beginning of the ramp)
 - Reduced momentum aperture at the QD flanges, especially with Q20 (below 4σ for negative momentum deviations)

LIU (LHC Injectors Upgrade)

- Important studies to be done in 2018
 - Post-acceleration and shaving in PS with longer trains (depends on the new power converters for 40 and 80 MHz cavities to be commissioned before start up if time permits)
 - Adiabatic bunch shortening in PS
 - Losses at 26 GeV in SPS
 - Slow losses at flat bottom: Losses with BCS beams, different optics (Q20, Q22, Q26)
 - New magnetic cycle with smoother start of ramp
 - Test potential of lower longitudinal emittance from PS (with at least nominal intensity) injecting into SPS and taking the beam through the full SPS cycle

LIU (LHC Injectors Upgrade)

○ Recommendations

• PS

- Continue improving impedance model and identify sources of impedance reduction that could benefit both beam stability and shape at transfer
- Add to the LIU-PS baseline the detailed design study of a 30-40 MHz wideband Landau cavity in PS (expected to be 2-4 MCHF), with implementation as early as possible (a YETS after LS2?)

• SPS

- Add to LIU-SPS baseline the correction in LS2 of the SPS QD aperture design problem, in 25 key locations (200 kCHF)
- Continue WBFB studies, check in MD at LIU intensities $2.0e11$. Perform conceptual study for H plane - lower Q' , emittance blowup
- Continue SPS collimation study and select a baseline, should be planned for deployment as can make factor 4 improvement in cleaning

• General

- Quantify possible gains from shorter CPS basic period – 300, 600 or 900 ms (which is not necessarily linked to PSB period)
- Perform conceptual design for 80 MHz 2 MV system (either for PS or SPS), cost expected 5-7 MCHF, for possible implementation in LS3. PS or SPS machine, frequency, voltage, bandwidth, power, integration

ABP-CWG

- Last meeting (#23) on Thursday 23 November, 2017 ([Indico link](#))
 - New HPCs cluster at CERN presented by N. Høymir
 - Should be running in test mode, IT are eager to have us test and work on our typical applications
- Miscellaneous
 - CNAF machines still down after the incident (flooding) back in November
 - Being physically moved today to new location, 1/3 of the cluster was damaged in the incident
 - Undamaged machines should be made available before the end of the year
 - We continue with the completion of the cluster and purchase of GPU server

Physics Beyond Colliders

- PBC Annual Workshop 21-22 November
 - Presentation by E. Koukovini Platia on future non-LHC users that will/might make use of the LIU upgrades and ongoing studies
 - ISOLDE beams in PSB
 - nTOF beam in PS
 - FT (MTE) beams for BDF in SPS