



DRAFT of DRAFT: Accelerator Physics Technical System Group Review

For Vancouver GDE meeting 2006

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Status of Accelerator Physics Group (1)

- Which 'Area' we have, covered:
 - LET (Low Emittance Transport), so far.
 - **From DR exit to IP (and to Dump)**
 - RTML
 - Main Linac
 - BDS
 - **Sources (Except for the undulator section for e+ production), Damping Ring**
 - No activity in our group. Area Group coordinates all works.



Status of Accelerator Physics Group (2)

RTML

- Lattice design completed
- Tuning studies has not been done much
 - **Worm sections (turnaround, BC wigglers, etc.)**
 - Simple 1-to-1 correction will not be satisfactory
 - **SCRF in BC1 and BC2**
 - Similar to main linac, but,
 - Large σ_E/E --> large dispersive effect
 - Large off crest phase --> tight tolerances
 - **Tuning for Longitudinal phase space - not studied much**
- Dynamic issues
 - **RF phase stability tolerances were estimated**
 - **Need studies on**
 - Design and performance of ·feed-forward (turnaround)
 - Design and performance of ·feed-back (Transverse and longitudinal)
 - **Some integration with downstream area will be necessary. (has not done yet.)**
- Need to give more manpower to this area (?)



Status of Accelerator Physics Group (3)

Main Linac

- Lattice design for performance study completed
 - **Undulator section lattice exists.**
 - **Other warm sections ? Not yet ?**
- Code benchmarking shows good agreements
- Static tuning studies has been (relatively) well done.
 - **Especially DFS (Dispersion Free Steering)**
 - Promising results from many people and many codes
 - **But not very much for other, or additional, steering methods**
 - **Bump tuning has been also shown to be effective.**
 - **Present status is probably fine for RDR stage**
- Dynamic studies
 - **Stability tolerances (vibrations, RF) are being studied.**
 - Some results but not enough
 - **Performance study of feedback have not been done.**
- Manpower should go from static issues to dynamic issues or to other areas (?)



Status of Accelerator Physics Group (4)

BDS

- Area Group coordinate most works
- Lattice design completed
- Alignment and tuning
 - **The old algorithm, which was good for 1 seed, turned out not to be good.**
 - **New algorithms are being tried.**
 - **Without dynamic errors, so far**
- Intra-train feedback
 - **Post Linac Fast Feedback**
 - **IP Angle Feedback. Based on BPM in BDS before IP**
 - **IP Position Feedback. Based on BPM after collision (beam-beam kick)**
 - **Luminosity feedback. Position-Angle scan. Maximize Luminosity per collision**
 - **Simulation Result, including Linac, BDS and IP, is promising.**
- Inter-train feedback
 - **1-to-1 steering is foreseen. No simulations yet**



Status of Accelerator Physics Group (5)

LET integrated study: from DR exit to IP and extraction

- Some ideas for total integrated study. But no actual study and simulations yet.

Non- LET area (Sources and DR)

- No activities in our group
 - **Except Undulator section for e+ production in e- main linac.**



- Possible cost reduction by the Valencia workshop:
 - **None**



Plans and Goals-1 Accelerator Physics

Plans and goals of this workshop (or soon later)

- Review status. Then,
- Agree to move static tuning to dynamic studies for Main Linac. (if it is appropriate. Static tuning studies in RTML and BDS have still high priority.)
- Agree on conceptual feedback design.
- Review realistic errors, or standard of errors. (Static and Dynamic)
- Discuss 'integrated' simulations, and agree on what is the realistic and effective way.
- Review and re-define tasks and a coordinator of each task.
- Agree on communication method (Web pages, TV/phone meetings)



Plans and Goals-2 Accelerator Physics

Plans between this and the Valencia workshop

- Complete missing part of lattice design (matching between areas).
- Simulations for static tuning
 - Mostly in RTML and BDS
- Simulations for dynamic errors.
 - RTML, Main Linac and BDS, basically separately.
 - Establish feedback system design from DR exit to IP, and simulate its performance.
- Start Integrated simulations.
 - Simple ones, e.g.: Using bunch compressor for alignment of main linac.
 - Start total integrated study
- Give refined numbers of tolerances and specs.
 - alignment, vibrations, strength stabilities, BPM resolution, etc..
- Start working for injector part (before DR)?????



Towards the TDR Accelerator Physics

Integrated studies of LET

- Need more computer power

Beam dynamics in Source Areas

Need iterations of

- Hardware engineering and
- Performance study