

Working Group report for
RCS
and
Transfer Line and Injection

Project X Collaboration Meeting,
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Discussion/potential mods to ICD-1 & 2

- Modify the ring design to allow both laser stripping and foil stripping injection
- No debuncher now in design of transfer line, but reserving leaving a place for it. Beneficial for J-PARC, for example.
- Lots of room for optimization of foil and laser stripping designs.
- Develop emittance budget. E.g. plan for 20 mm mrad in RCS to get 25 mm mrad in reality.
- Did not hear RF presentation, no comment on this. But was concern about RF going to low values at end of acceleration 1.2 MV to 70 kV.
- Instrumentation not discussed. Would like to have input to instrumentation. E.g. stripper foil temp, stripper foil electrical signal.

RCS R&D plan presented by V. Lebedev

R&D plans

- Build and test half cell (dipole, quad and vacuum chamber)
 - Build a first-harmonic RF cavity
 - Choose injection type
 - ◆ If laser stripping - start corresponding hardware work
 - ◆ If foil stripping - modify lattice in the injection straight
 - ◆ Final proposal cannot be made until we resolve this issue
 - Simulations
 - ◆ Experience obtained with ORTIT suggests that it will satisfy our immediate needs
 - Orbit can account the space charge and impedance but cannot do multi-bunch simulations
 - Instabilities can be addressed separately
 - Better simulations are not expected to change main features of the design
 - ◆ Simulations of beam collimation and beam dump have been started
 - ◆ Beam RF loading and longitudinal instabilities require detailed study
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Transfer line R&D plan presented by D. Johnson

ICD-1

Transport Line

- Continue Collimation design

Recycler Injection

- Further optimization of Recycler lattice (detailed modifications required)
- Investigation of dynamic aperture, space charge, tune footprint, etc.

ICD-2

Transfer Line

- Optimization of transfer lines
- RCS extraction/Recycler Injection optimization
- Collimator design (in conjunction with ICD-1 effort)

RCS Injection

- Injection optics
- Foil stripping
- Laser stripping
- Waste beam handling

Mods to R&D plan for ICD-2

- Overall R&D plan looks good.
- Transfer line is straightforward.
 - If resources are limited, emphasize R&D on collimation
- RCS
 - If resources are limited, emphasize R&D on stripper foil and laser stripping.

Goals and work plan for FY'10

- Work plan:
 - Decide on preferred config so design can continue.
 - Work on collimation in transfer line
 - Work on injection for ring.
 - Start design and fab of dipole / quadrupole / corrector / vacuum chamber half cell.
 - Start design work on RF cavity
 - Better understanding of beam loading and compensation is required. Closely coupled to LLRF (although probably covered in RF working group, just want to make sure it was covered.)
4X larger current in RCS compared to Main Injector.

Goals and work plan for FY'10 (cont.)

- Goals:
 - Conceptual design of ring inj that accommodates both foil and laser injection
 - Optimization of foil and laser stripping designs.
 - Optimize transfer lines for collimation and add space for debuncher. Decide if need debuncher in transport line.

Provisional distribution of responsibility, and funding, for FY2010

- BNL: collaborate on injection and stripper foil design
- SNS: collaborate on H^{0*} tracking and laser stripping