

MI/RR COMMISSIONING PLAN

Ioanis Kourbanis

MI Department

05/14/13

Accelerator and NuMI Upgrades for NOvA

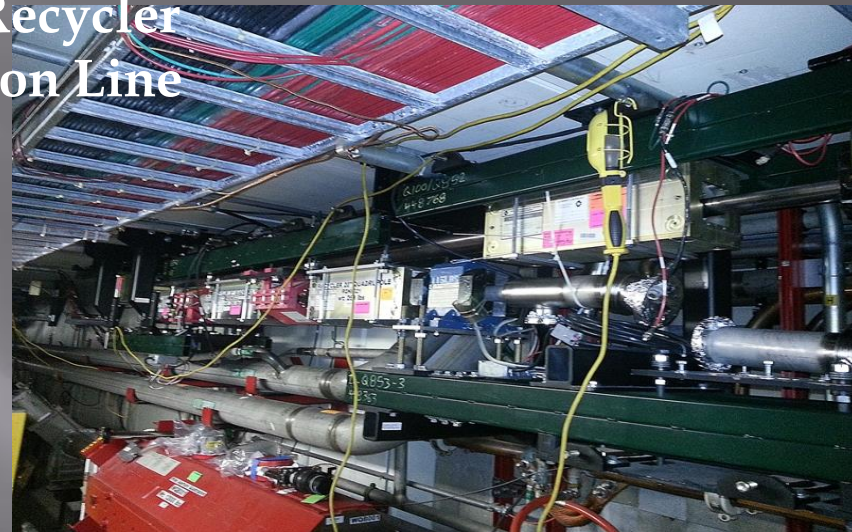
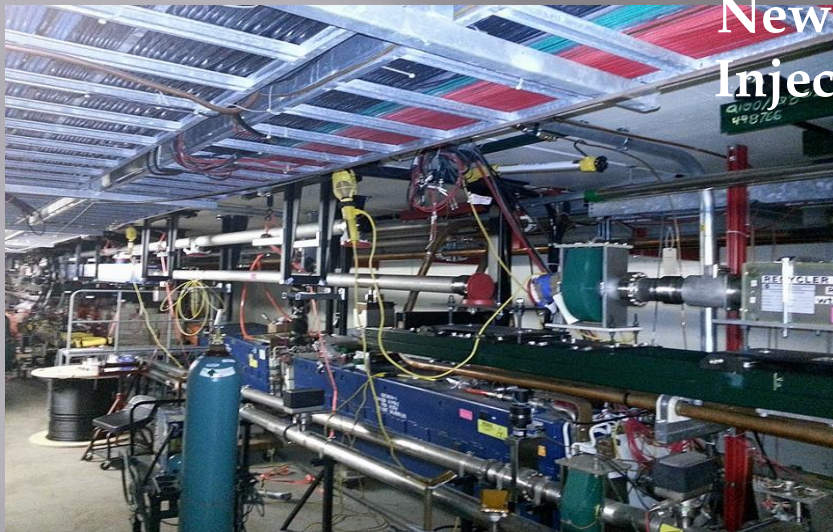
- Recycler Ring, RR
 - New injection line into RR
 - New extraction line from RR
 - New 53 MHz RF system
 - Instrumentation Upgrades
 - New abort kickers
 - Decommissioning of pbar components
- Main Injector
 - Two 53 MHz cavities
 - Quad Power Supply Upgrade
 - Low Level RF System
- NuMI
 - Change to medium energy ν beam configuration (new target, horn, configuration)
 - Cooling & power supply upgrades



The capability to inject from Booster to MI is maintained!

Pictures of Recycler ANU Installation

New Recycler
Injection Line



New Recycler
Extraction Line



Week 1

- ▣ Establish MI Circulating beam and establish orbits.
- ▣ Accelerate MI beam to 120 GeV and measure orbits. Determine quad moves and move quads.
- ▣ Extract beam to NuMI target and start target scans.
- ▣ Start RR Injection line commissioning.

Week 2

- ▣ Extract beam to SY120.
- ▣ Start Recycler circulating beam studies.
Establish working point.
- ▣ Start beam delivery to NuMI target with increasing intensities.
 - Non slipped stacked beam 1.7 sec MI cycle.
 - Can achieve up to 300 KW with nominal beam intensity from Booster.
 - Close to 100% efficiency
 - Only 3.5 Hz from Booster are required

Week 3

- ▣ Start RR 53 MHz commissioning.
- ▣ Start RR Instrumentation timing and commissioning.
- ▣ SY120 Studies
- ▣ Continue the beam delivery to NuMI target with increasing intensity.

Week 4

- ▣ Start RR measurements
 - Measure momentum aperture.
 - Measure chromaticities
 - Tune and orbits compensation
- ▣ Start RR extraction line commissioning.
- ▣ SY120 Studies
- ▣ Beam to NuMI target (300 KW).

Weeks 5-9

- ▣ Start RR high intensity studies.
 - Beam scrubbing?
- ▣ Start RR Slip Stacking commissioning.
- ▣ SY120 beam commissioning with high intensity.
- ▣ Continue beam delivery to NuMI target.

Summary

- ▣ Beam to NuMI target for tuning within a week from start-up.
- ▣ Start SY120 beam studies after 1 week from start-up.
- ▣ Reach 300 KW beam power after 1 month.
 - 6 Booster batches in MI, 1.7 sec ramp, no slip stacking.
- ▣ Reach 500 KW beam power in 5 months.
 - Using slip stacking in the Recycler.
 - Assuming 7 Hz Booster running

Projected MI Power and POT

