

# Summary of work done

C.Y. Tan  
24 Oct 2019

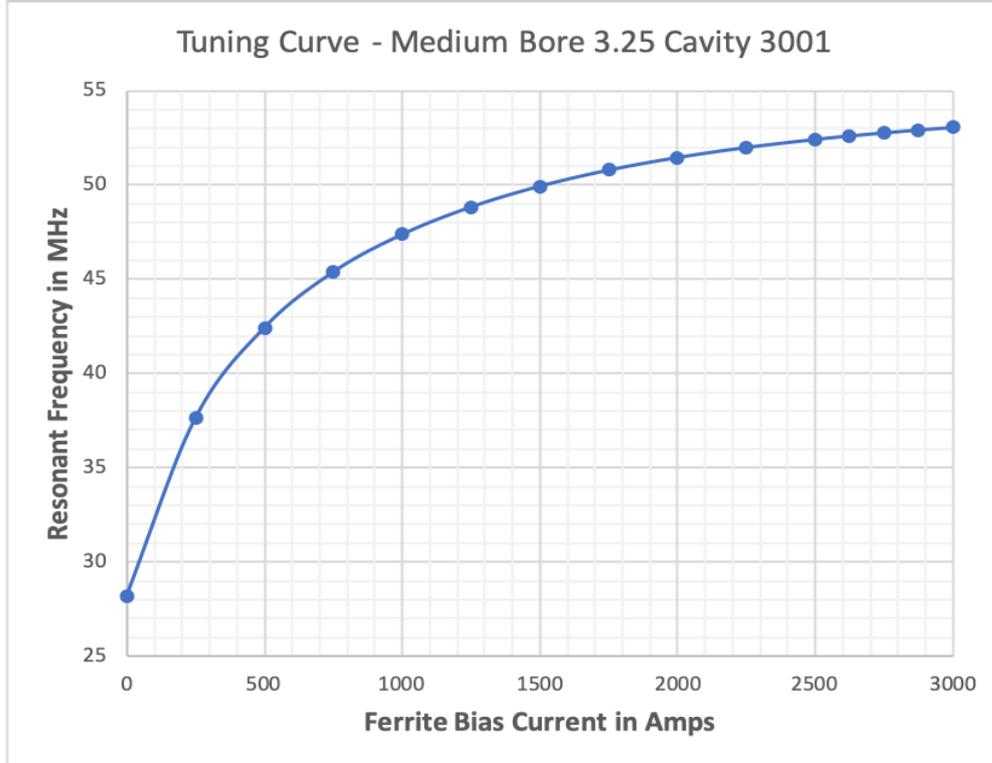
# Startup blues

- Sources
  - Source A gas pressure is too high
    - Cannot find leak. Will use for now. Need to measure emittances.
  - Source B requires Cs boiler to run at high temperature (~140 degC)
    - Clog?
    - Seems to work!
  - Postmortem
    - End of next shutdown will start **both** sources ASAP. They naturally won't start at the same time anyway so will stagger start which is what we want.
- LRF4 breaker changeout.
- Booster dampers problems
- Power outages on Wed 23 Oct and Friday 25 Oct doesn't help with startup

# Status of PSP projects

Machine	Description	People	Status
Pre-Acc	Improve neutralization in LEBT with N or Xe.	Kiyomi/Dan/ Pat	More beam to Tank 1
Pre-Acc	Penning source from RAL is in Illinois!	Haider/Dan/Pat	Finally shipped from UK.
Pre-Acc	Laser collimation of head/tail of longitudinal beam. (LDRD)	Dave	In contact with vendor for selection of optical engine.
Pre-Acc/Linac	Simulation of PreAcc + Linac	Valeriy/Kiyomi/Dan	Permanent magnets being considered.
Pre-Acc/Linac	Re-aligned RFQ	Kiyomi/Dan/Pat	Realigned during shutdown
Linac	Klystron testing	Kiyomi	Leak in KRF005 repaired. KRF8 pulse transformer swap with test station. Will start testing all the 4 spare klystrons that have not been tested (2 months each)
Booster	Flat injection porch	Kiyomi/Bill/George/ Howie/Chris	Identified a whole lot of issues ...
Booster	Adiabatic capture	Chandra/Tan	Studies on 31 May. Showed how neck can removed. However, phase oscillations still need to be tuned out.
Booster	2 <sup>nd</sup> harmonic	Robyn/Tan	Removed from cave. Getting ready for repair.
Booster	Wide bore cavity	Salah/Matt	In test cave. Low power tests show cavity does not reach extraction frequency at 2500A. Will continue high power tests at injection frequency. Do sims to lower mu of tuners.
Booster	2 stage collimators	Valeriy/Chandra	Had meeting on 12 Dec 2018 to decide on the length of the primary collimator. Work to see amount of shielding needed for tritium control in sump water.
Booster	Injection girder and injector civil construction to Booster	Dave/Salah/ Tan	Changes to civil construction to make the hole in Booster wall easier/practical.
Booster	Garnet loss improvements	Robyn/Tan/Iouri/ Gennady	We have a design for both the test fixture and solenoid. Mechanical engineer to start drawings.
Booster	Mode 2 longitudinal damper	Nathan	Victor and John did studies on 31 May to characterize mode 2 from cavity signals.
LLRF	GMPS machine learning (get rid of reference magnet)	Bill/Brian/Kiyomi	Got task codes (05 Apr). Work to start soon.
LLRF	Complete DDS upgrade, paraphase controller	Brian/Ed	Will try to tune in the digital paraphase module again ...
LLRF	Phase feedback, radial feedback	Brian/Ed/Bill/Tan/ Valeri/Craig	Expect first test before end of May.

# Wide bore initial low power test results



Both low end and high end of the frequency curve is shifted **down**. So there is too much mu. Have to figure out how many ferrite rings to remove in tuner.

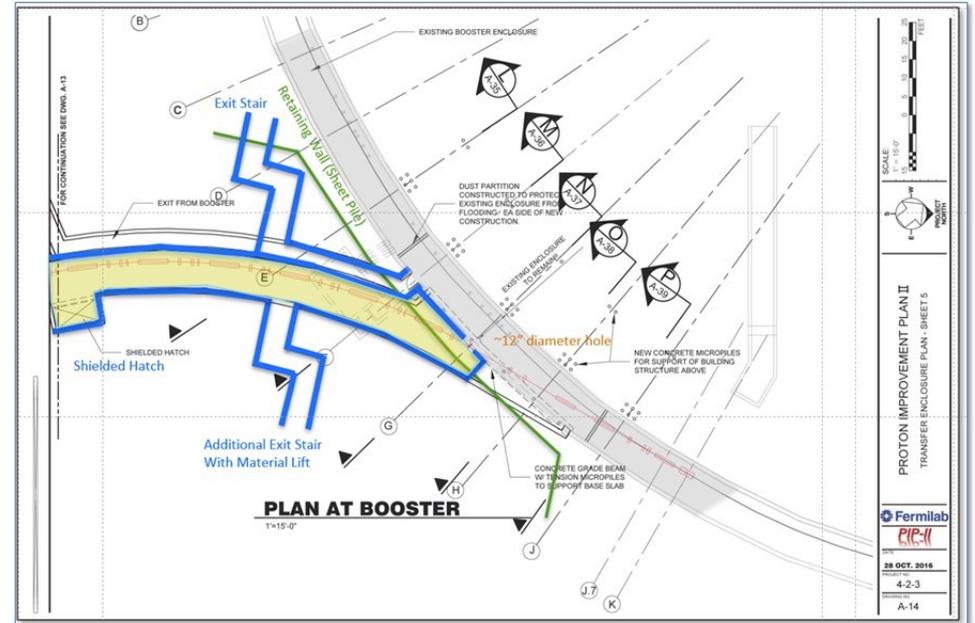
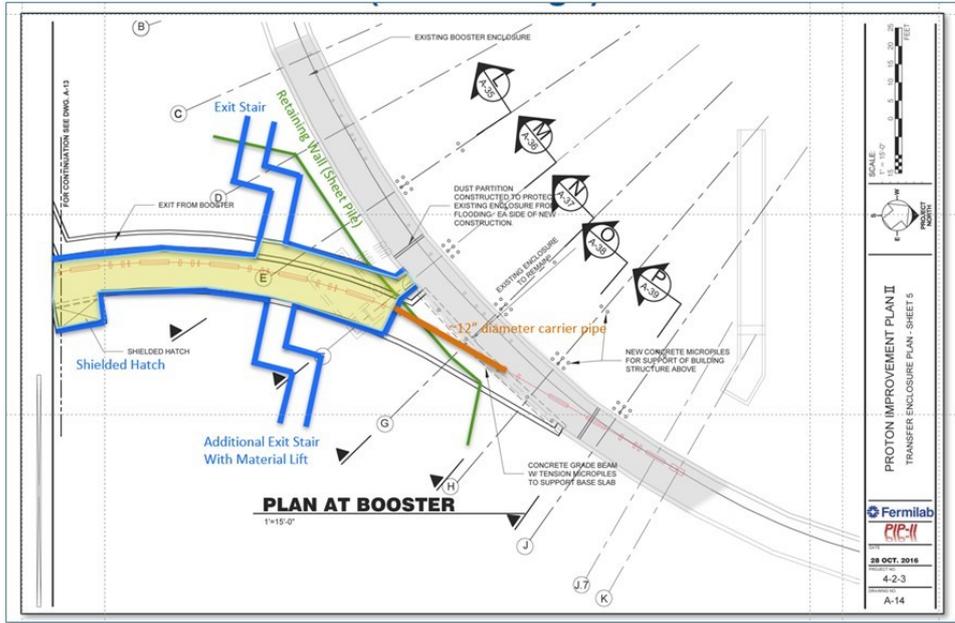
About 416 kHz lower at high end required: 53.2 MHz (bias 2500A). Can reach required 52.8 MHz (bias 2800 A)

# Task force updates

- Injection girder
  - Proposed collimation in BTL to reduce/eliminate waste beam. (Meeting on 08 Oct)
  - Injection at 700 MeV. Saves ~1/2 m of space
- Lattice
  - Method to reduce 1/2 integer proposed.
    - Studies once Booster starts up
    - Work on effect of removing corrector at L11 (see today's talk)
- Digital LLRF
  - Had a meeting with Brian Chase about PIP-II LLRF injection scheme on 18 Oct.
    - There are potential problems from the injection scheme to GMPS requirements for flat injection.
      - Not clear that any of the proposed methods will work at this time!
      - Studies have been proposed.
- Magnet girder tests
  - Set up at E4R
  - Area needs to be cleaned up.
  - Lead person has been identified for install/cleanup: Fernando Juarez (Mechanical)
- 20 Hz infrastructure
  - First meeting held 19 Sep 2019. Docs on beamdocs. A lot of work!
- 2 stage collimators
  - Work will start in November after task code is issued.

# Task force updates (cont'd)

- Wide gradient extraction magnets
  - Mechanical has gone to L3 and video taped the area to figure out how to move out old magnets.
  - Valeriy K., Jeff E. & Salah C. have gone downstairs to measure unused septa.
  - Calculation for gap size to be completed by end of October. Required for TD to start their calculations.
- 20 Hz cavity tests
  - See today's talk.
- Shielding assessment
  - First meeting held. M. Vincent (Safety) will be leading.
- Tevatron tunnel mods for BTL
  - New lattice means no more rolled dipoles to get above the ceiling.
  - A beam pipe will go straight through the tunnel. Removed when necessary to move magnets.
- BTL to L11 changes
  - Considering different construction method to make the hole for beampipe into Booster (Meeting on 22 Oct). See next slide.



Option 1: 12" carrier pipe. Chute option.

Option 2: Retention wall, saw cut hole

Option 2 is more expensive than option 1. However, gives flexibility of moving dog leg outside Booster, more space for instrumentation.

Requested more penetrations in the design.