

## Injector tasks

10/11/23

### Finish the injector upgrade

Repair the FX solenoids

Another solenoid upstream of booster? Only if the FX fix doesn't work

Wien filter mods? Complaints about VWien

### Chopper

Have Mark test new chopper feedthroughs

Matt order a new connector, have Greg finish the last chopper feedthrough

Pull chopper slit chamber at next SAD, survey As-Is

replace the slit actuators,

Two actuators ordered, need to order two more (Vacuum Generators)

have them aligned by S&A

Need an electronics box to move the slits, control stepper motors, during alignment

install FY solenoids, with new plates, no notch

New photocathodes: polarization only 84% and QE is ~ 0.3% (for one of the two photocathodes)

New SVT arsenic capped GaAs/GaAsP photocathode

ODU DBR photocathode

Suitcase stand

Install new pucks at CEBAF and not at test lab, use the intervening 6 way cross as 'docking station'. 6-way vacuum cross gets a heater and two prong-ed puck holder. What I imagine we will do at UITF

Dedicated suitcase, leave it in tunnel (we used to have two suitcases, where did the other one go? need a 4.5" gate valve and linear motion stage, garage)

LLRF for KLong laser rep rate

Dedicated NF3 tank and regulator? Seems a waste of money since rarely used

New NF3 leak valve?

Buncher amplifier: 400 W is overkill, bring this amp back to UITF, replace with 100 W amplifier

Finish the injector vacuum upgrade: Gamma SPCe supplies, communication via RS232

Do we trust what the injector BPMs tell us?

Yao time of flight application, what's required to have this application ready for regular use?

Why don't we use 5 MeV spectrometer? Back phasing bunchlength measurement there?

Water cooling to dump, flow meter

Size of dump, power limitations

Aperture cooling assessment, finish it, revisit it

OL01 viewer, beam high and to right

OL03 harp

OL04 field emission, making everything radioactive

New, spare R28 gun white insulators (we have the spare gun at UITF, one insulator on a 10" flange but might not be compatible with a gun, HV test stands?)

Model/design a new gun electrode for 18" chamber, one that doesn't focus beam so hard. Similar focusing properties as the tee electrode. Demonstrate via modeling that it is worth the effort to install a new gun that could reach 200kV reliably, in particular, demonstrate similar or smaller helicity correlated position asymmetries

Beam tests:

- 1) Do we trust what the injector BPMs tell us? Use viewers, move beam left/right/up/down and verify consistency between viewer and BPM readback (how to account for focusing, betatron motion?)
- 2) GPT simulation validation: Max method of verifying we have correct field maps in the model
- 3) Reproducibility. Save file, turn OFF machine, load file, turn ON machine? Does the beam go where it's supposed to go? What changed? Steering and/or rf phasing?
- 4) KLong beam dumped in chopper: evaluate parity quality on A beam through entire injector, KLong beam OFF and then ON
- 5) 2-Wien spin flip, perform this often, during the NP run
- 6) VWien assessment?
- 7) Beam based evaluation of chopper slit position?
- 8) Damping, are we getting any across the booster? skew quad added in front of booster? Expect a factor of  $\sim 4$  reduction, square root (6.7/0.46)

MOLLER related

Grounding system

IA electronics

RTP pockels cell electronics

Helicity magnet electronics

Helicity quads? Wire dipoles like quads, work with Users to evaluate target sensitivity to HC spot size variations

Helicity decoder boards

5 MeV Wien filter for a couple degrees spin rotation?

Skew quad upstream of booster if we want to eliminate x/y coupling and thereby achieve better adiabatic damping