**Shutdown 2019 Jobs**

1. **IOTA**
   1. Vacuum
      1. Leak check the entire ring.
      2. Mitigate leaks. Mostly at the viewports.
      3. DR aperture restriction investigation
      4. Install IPs in 800 line and on NL insert?
      5. NL insert and octupole string may be removed for next run? NL spool piece?
      6. Install vacuum valve? Make three vacuum sectors.
      7. *Ring is nonsymmetrical – 4 cm off, alignment is crucial*
   2. Optical Stochastic Cooling
      1. Configuration of EL and ER – drawings
      2. Removal of ER/EL magnets and associated equipment
      3. Installation of spools, vacuum hardware, magnets, kickers, and support stands
   3. Proton Source
      1. Disassembly – RFQ turbo pump removal begins Monday 4/15
      2. Transportation to NML for storage
      3. Installation in Cave and NML/ESB
   4. Undulator remote control
   5. Modification of sync-light boxes with Raspberry Pi electronics
   6. IBEND modify or replace - 5 A 180 Hz noise issue – switcher or filter
   7. *Condition horizontal kicker when new supply is online*
2. **FAST Injector**
   1. Photocathode QE measurements (and commissioning of a new photocathode?)
   2. Completion of X118 rotation commissioning
   3. CC1 LLRF investigation
   4. Gas-jet Monitor at 505 location
   5. CC2 conditioning with 5 MW station instead of 300 kW
   6. *Make TPM image orientations consistent*
   7. *Swap polarities of HV100 and HV101 in order to make them consistent with the reset of the Linac*
3. **Utilities** 
   1. Sump pumps – PM and replacement
   2. ICW strainer repair (affects Laser Room)
   3. ESB AC unit issues. FESS is a limiting factor when the AC unit is cheap, but the cost specified by is extraordinarily high.

**Week of April 29th**

1. TPM filter wheels at 605 and 613 made functional ***Rick, Obrycki, Crawford***
2. Run 500 MCM cable for IBEND reconfiguration ***Obrycki & Rick***
3. Make TPM orientations consistent, X121 is reversed ***Crawford***
4. Start leak check of IOTA, sync-light boxes need to be removed, mitigate leaks ***Franck (Elias if available)***
5. Alignment as-founds? Tuesday/Wednesday May 7/8 ***Virgil***
6. Swap polarities of HV100 and HV101 for consistency and verify operation ***Obrycki & Crawford***
7. Modify microswitch housing on X107 ***Obrycki***
8. Is UV Laser operations finished so I can schedule ICW repairs? ***Crawford***
9. Staging of RFQ and other HINS equipment? Floor. When Cave? ***Rick***
10. Talk to Smedinghoff about NMLSCRF.bd on all consoles at NML ***Crawford***
11. Remove Sync-light lens tubes ***Santucci***

Power outages in May during 5-9 on-off operations.

Configuration when we come up? Ans. NIO and Octupole stay in.

Engineering Meeting May 1, 2019

HINS removal and transportation – need communication

If want an elliptical spool piece for undulator then MS Drafting needs to be notified with dimensions.

Transformer removal – Featherston non-responsive, no paperwork generated. Taking forever at CMTF.

Proton injector lattice needed asap. Steve has stopped working on the layout until we know lattice.

Purchase Req for ceramic breaks goes out today.

800 line spool bellows is fully compressed due to shift in IOTA. May need to make new spool for hanging pumps.

NML chiller needs repair. 32 hours for contractor to repair. 2 compressors and a crankcase heater.

Are we plating the remaining dipole chambers? This would be during OSC

Re-terminate the octupole string? Installing terminal blocks would help.

Bakeout the 800 line for a test?

What would be charged to our task code for the pump rebuild?

May 27th is deadline for Laser Room interlock testing and Nov 7th is deadline for Cave interlocks.

Kinney pump oil change and seal replacement? Ans. Possibly starting at mid May.

HINS installation: Need to know definite amount of magnets and diagnostics.

5/6/19

M4R and M4L leaks on viewports.

5/8/19

Talk to Dan about:

* Leak check results. Should we wait on M1R since it is in a tough spot?
* The infrastructure is in for connecting CC2 to CM2 klystron. Are we still in agreement that the risk is too high?
* Since Wayne will be gone soon, should we have him train Dave, Rick, and Jamie on the procedure for pulling roof blocks? Need to pull blocks soon, then.

5/9/19

Training for roof block removal will need to occur on May 20 or 21. Rick is already trained. Dave and Jamie need training.

Need decision on IOTA Bend power supply replacement or Prague filter.

We are going to replace all 3 Edwards pumps with new. The 2 sent for rebuild will be our backup. This will need to be sole sourced since the pumps are over $7000 each. The 2 new Edwards scrolls delivered to NML have vanished.

Budget 2 weeks of cleanroom time for Rick to clean hardware and new X107 stepper motors. Need to order new linear motors. We can re-use rotary motors and 50:1 gear reducers. Cleanroom curtains need to be cleaned.

We need a new 800 line spool to alleviate the compression of the bellows. It appears the Lambertson will need to move further west which would compress the bellows even further.

Suggestion was to break up IOTA Bend Reconfiguration section into smaller jobs. Chris Jensen has requested the use of a bend magnet to determine the inductance of the ring.

5/10/19

IOTA leak check: M3R, M4R, M4L viewports; M1R downstream flange.

HINS lattice file and layout? # of Quads is now known, using HE correctors and LE dipoles in the lattice. Not ready to give lattice to Steve Wesseln.

IOTA bend bus cable configuration? Chris Jensen wants to measure the inductance of the string. Could use one of our spare magnets for determining inductance.

Pulling X107 to replace parts.

If the Lambertson needs to move further west in alignment then a new spool will need to be created.

Laser Room safety system tests on May 20. Afterward, Rad Safety will need to remove chains so roof block training can occur on May 21.

*1 kV amplifier needs moved to ESB. Monday, Rick to use crane and cannot be moved on wheels to ESB. Obrycki to move and connect in ESB.*

5/20/19

The Cave enclosure was searched and secured over the weekend for Laser Room safety system tests to occur on Monday at 08:00. The secure will be dropped once the safety tests are over. Rad Safety RSO and RCTs will unlock the Cave roof chains this afternoon so Cave roof block training can occur Tuesday morning.

So far I don’t have any information about the IOTA ring alignment moves needed. Hopefully this week we will know where the discrepancy is, if there is any.

The HINS source removal continues. Once the source and the HV racks are here then I believe the move is complete. High vacuum cleaning of parts will be done by Debbie if she is available. I will check.

We should prep the X107 area for the cross removal. Let’s locate a cross that can go in its place and have it particle-free cleaned. Use the cleanroom budget code.

5/23/19

Talk to Yurick about closing IOTA LCW valves.

Grease ordered for X107.

Alignment of IOTA magnets looks good.

All hands are needed for pulling IOTA bend bus cable.

Mark says he will need help with transport/assembly of Prague filter.

Email Phillippe for drawings so I can have Steve Wesseln start work on the stand.

5/24/19

Questions:

What is the decision on the IOTA power supply?

What are we doing about the IOTA bend bus cable?

ICW strainer approved but what do we do in the short term?

We need a lattice for the proton line. Is it finished? When?

6/12/19

Mechanical Support Engineering Meeting

FAST needs to schedule Craig to assist with the installation of the IOTA gantry. When?

Main Injector/Recycler Dept is interested in the gas jet monitor for their diagnostics. Sebastian and I will give a talk to their department.

Power outage on Friday June 14 which takes out power to 2nd floor for 7 days.

6/13/19 8:30 Meeting

IBEND cable has been installed, spliced, and crimped. Will need to get jumper request so we can verify connections. Need to verify field orientation, too. Will need to look at splices with a thermal camera.

Particle-free cleaning of parts for certification station has begun. These will allow the HINS wire scanners to be certified once they pass the RGA scans.

RGA scan of the HINS RFQ is a much larger project than believed. The water manifold needs to be connected to the 3 large turbos. The chiller needs to be brought online for cooling the turbos.

6/28/19

Last week we powered IBEND and checked the splice connections with the thermal camera. Field orientation was verified, too.

The new IOTA viewports have been particle-free cleaned. Next week they will be leak checked, certified, and installed at M3R, M4R, and M4L.

This morning we started the purge of the IOTA vacuum system so the DR undulator beamtube can be removed and sent to the machine shop for rework.

The RGA scan of the proton source wire scanner came back showing contamination. Lucy is looking at the scan peaks to determine what the contamination might be. The RFQ water system was installed and one turbo is pumping down the chamber in preparation for an RGA scan.

Currently, building the frames for the chokes. All components are on order or on site. Wiring will start around July 8th. Week of July 15th is the estimate for completion and delivery.

Re-alignment of IOTA: A crew will show up next week to measure dipoles relative to each other and perform moves.

DCCT calibration and noise mitigation.

7/10/19

**HA of Octupole string removal**:

The Burndy connectors that breakout power to the individual magnets need to be disconnected to remove the electrical hazard.

The octupole string is affixed to an extruded aluminum structure which is supported at 3 points on the girder. There are anti-tip fixtures that secure the octupole string to the girder. A forklift will be in place to support and remove the string once the anti-tip fixtures are disconnected from the girder.

There is a pinch hazard when disconnecting the vacuum flanges from each end of the octupole string.

The quadrupole magnets on each side of the octupole string need to be off to mitigate the magnetic field hazard when disconnecting the vacuum flanges.

**HA of Undulator vacuum beamtube removal**:

The Undulator permanent magnetic field is a concern when using tools in the vicinity. The Undulator will be in the out position for the job, which allows access to the beamtube. The upstream vacuum flange is near quadrupole magnet N:IQD2R. The quadrupole power supply must be off so the magnetic field isn’t a hazard while disconnecting the vacuum flange.

There are lead bricks that surround the upstream side of the beamtube. These are supported on an extruded aluminum frame. The bricks need to be removed before disconnecting the beamtube.

The work will mostly take place on the inside of the IOTA Ring. The job will require reaching over the LCW supply and return copper pipes. The IOTA cable tray is located above the pipes and is also an obstacle.

There is a possible pinch hazard when disconnecting the beamtubes.

7/12/19

Safety

* Work pause
* Hazard Analysis

IOTA

* Alignment crew for another round of as-founds
* Octupole string removal
  + Will be placed on an aluminum table for rework
  + Install spool piece at BL
* Undulator beamtube rework
  + Shop is testing methods for making elliptical beamtube from 1.5” diameter tube
* IBEND Prague filter
* Gantry installation
* Viewport leak checks and installation

Proton Source

* RFQ RGA scan
  + Using rebuilt RGA from CMTF
  + Needs to be calibrated before loaned to us
* CAD drawings
  + LEBT configuration needed for drawing
  + Ion Source HV cabinet drawings (no NX requirement)
  + Ion Source stand (NX)
  + Ion Source bending magnet stand (NX)

FAST

* Halo monitor
  + Relocation to 452 region acceptable?
  + Can we easily modify a HE ion pump stand or trim magnet stand to support the cross?
  + Drafting support? Priority?

MPS

* Latest version of firmware will be installed either today or Monday
* Version is for IOTA beam trigger
* Need to verify with laser operation
* New FPGA board added to the crate for separating MPS from timing
* Need repeater boards from Brian Fellenz so signals/triggers can be fanned out

Power outages

* Aug 1 06:30 – 07:00
* Aug 28 06:30 – 07:00