Weekly Report – week of October 3rd, 2011
Fabrication and Assembly of ERL hardware
PI: Ilan Ben-Zvi, Brookhaven National Laboratory

Controls: Remote communications have been established with a Danfysik power supply chassis using RS232 after issues with the serial cabling were resolved. RS485 will be evaluated, though the results will not significantly impact forthcoming power supply testing. Iterative updates are being made to the DG645 delay generator interface software in consultation with Brian. Plans have been established for temperature monitoring using a VME module (as we've done for the FPC conditioning) with new software logic to generate a TTL interlock signal for the MPS from another VME module when high temp conditions arise. Software development for this project has recently been started.

Cryogenics:
CryoControls: The wiring of the last bit of instrumentation on the cryoplant side continues.
Electric feeds: The facilities engineer is scheduling the installation of the remaining electric feeds.
Cryo System: FMEA (Failure Mode Effect Analysis) is almost completed.
Cryolines plant: The last remaining field jacket has been welded up with Mass spec leak checking next.
Wet expander: The belt is to be scheduled for installation.
LN2 Storage Dewar: Preparing for a splash test for the dewar to check out valves and lines with LN2 in the dewar. Dewar insulating Vacuum has been holding very well.
Cryogenic transfer lines to ERL cryomodules: Scheduled for a November start for installation.
Cryogenic transfer lines to ERL cryomodules, piping supports: The engineering and design for the piping supports for these lines continues.
Sullair compressor: The relief line from inside of the building to outside still requires installation.
A review meeting has been scheduled with the Labs safety committee
SRF Gun Cryomodule interfaces: The relief header system materials requisition has been placed.
SRF Gun Cryomodule cryo instrumentation: Installation of temperature sensors as the cryostat build-up continues.

Gun Cryomodule/5-cell cavity: Concerns have arisen over the geometry of the FPC to gun copper vacuum seal. The vacuum group and AES met to discuss design changes to assure a reliable vacuum seal. The transport cart assembly continues with a scheduled leak check and survey to test repeatability during insertion of the cathode.

Instrumentation: The two emittance monitor pepper pot assemblies have been received from Radiabeam, and undergone a first stage review and meeting with the

supplier here at BNL. These assemblies are scheduled to undergo clean room evaluation and bake out with RGA. Survey and alignment procedures are being reviewed with the survey and vacuum groups. The effort to provide image analysis algorithms to obtain emittance data from the profile monitor downstream of the pepper pots is underway with help of instrumentation physics and Controls. The order for the balance of VME control cards needed has been finalized. Work is in progress to define the beam power limitations on plunging instrumentation elements. This data will be folded into the definition of operating modes of the machine. Work continues to define the I/O required by the MPS to properly protect the machine & instrumentation while operating in the various modes. Cable installation plans are being made to deal with the present partial tray installation for G5.

Laser: Assembly issues for in-vacuum laser transport mirror were resolved, the test-fit of mirror successful. Continuing work on timing system design: as LLRF design for the gun has developed, engineering issues on the interfaces between top-level accelerator control, LLRF, and the timing system have arisen. We continue to test and implement modifications of timing hardware module control software. Scheduled maintenance on Lumera laser performed.

Large Grain Gun: Preparations for magnetic measurement of the dewar were completed this week, and magnetic measurements are expected on Friday. The large grain gun program resource estimates were largely completed this week. Preparations for the fabrication of the copper cathode are ongoing, and a quotation for fabrication and assembly of the cathode has been requested from Advanced Energy Systems.

Mezzanine: The mezzanine has been lifted and is supported with concrete piers awaiting the contractor to attach leg extensions.

Photocathode: The stalk pieces have been inventoried with pictures and a parts list. The stalk was completely dismantled. Items were separated as to what can be or what has been fired in the oven and what has not been fired yet. Parts were delivered to the vacuum group for cleaning and bake out. A replacement thermal couple feedthrough has been requested. The laser bread board has arrived.

Vacuum:

1. The FPC gaskets were pinched when installed. The two spare seals OD have been reduced to improve the engagement. An FEA analysis of the RF contact was conducted. The force to close the flanges was found to be high. The profile was modified to reduce the closing force on the seal. AES has released the drawing to the machine shop to modify the two spare seals.
2. The cathode side gate valve on the gun string was inspected to confirm the presence of the sapphire viewport.
3. Progress with the ERL block house cable tray layout was reviewed to ensure compatibility with portable clean room operations for beam line assembly.

4. Detail design of the ERL zig-zag chambers continues along with vendor correspondence. Procurement documents are drafted. An RFQ is expected within a month.
5. Portable clean room tent is being set-up over the injection line to install double solenoid chamber immediately upstream of the 5-cell. The chamber should be installed by next week.
6. Laser transport vacuum components and supports are complete. Survey data provided. All components staged and awaiting marking and anchor drilling which will be followed by transport line installation.
7. Awaiting completion of the laser mirror holder ring spacers from Central Shops to complete laser mirror assembly and laser/ion-pump cross assembly.
8. Designing an alternate e-gun HOM Damper impedance bridge between the ceramic and metal cuffs. May be pursued in parallel to the conductive painting option. Either solution will still require sputter coating of the ceramic.
9. 2 pepper pot assemblies are staged for UHV and PF QA in the 905 clean room.
10. Cleaning and processing of the deposition system components continue. Most parts are clean and scheduled for vacuum firing over the weekend.