Weekly Report – week of October 17th, 2011
Fabrication and Assembly of ERL hardware
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Controls: The preliminary software module for ADO collecting information on high temperature conditions is ready to be tested. A VME board has been setup in the control HW lab which incorporates digitizer 3122 and a digital output board 1160 for testing purposes.

ERL injection line: Vacuum chamber drawings are in for signature. The statement of work and specification for the chambers are complete. A requisition for the chambers will be written once sign-off is complete.

Gun Cryomodule/5-cell cavity: The final FPC has been mounted to the e-Gun cavity and should be rolled out by next week. Extensive work was completed on the cathode insertion cart. Work will continue on the cart to define the repeatability of the device in delivering the cathode through the choke.

Instrumentation: The two pepper pots have made it through the clean room process and are now at acceptable "particulate free" levels. The next step is to bake out the vacuum portion and perform an RGA test. The four halo scrapers arrived this week and have had a preliminary inspection and await their turn in the clean room. Work is in progress to integrate the control of these motion devices into the ERL control system. We are preparing for witness testing of the remaining four profile monitors on site at Radiabeam in two weeks. Connections are being made at ERL to prepare the beam loss electronics to be tested during the upcoming RF cold emission test. Testing of the high resolution transformers for the differential current measurement is in progress to determine the effects of adding an additional 15m of cable to the existing 50m purchased with the transformers. The parameters of concern, offset, zero stability, and temperature dependence have not shown to be adversely affected with the additional cable.

Laser: Conducting studies of how the laser frequency locking handles coherent frequency modulations in the reference frequency, in order to assess its performance in operation, when acoustic resonances in the superconducting cavities are compensated and the laser must follow the compensation. Preliminary results indicate that the laser can follow modulations on the order of 100 Hz at modulation frequencies between 10 and 30 Hz (where the cavity acoustic resonances are). Some disturbing indications of a broad resonance between 100-200 Hz have also been found however, and the high frequency behavior also shows some anomalies.

Large Grain Gun: Work continues to finalize resource estimates for submission to Project Controls. Among the outstanding items are the estimate for copper cathode fabrication and some incidental project details. The quotation for the copper cathode is not yet ready from the vendor. Requisitions have been completed for several last vacuum components for cavity and camera vacuum systems. Several items have been submitted to E. Lessard as part of the safety review process

including a list of the drawings associated with the project, a completed hazard identification checklist, and preliminary assembly drawings of the experiment as well as the cavity and portions of the camera vacuum systems. Currently we are working to arrange Pressure and Cryogenic Safety Subcommittee reviews of the cavity and camera vacuum systems.

Mezzanine: The mezzanine has had the leg extensions installed. The mezzanine has been lowered back on to its legs and fastened to the floor. The floor is being prepped for cleaning and epoxy coating for the cleanroom. The components for the cleanroom continue to arrive from the contractor Cleanroom West.

Photocathode: (Cleaning photocathode set up): The Excimer laser functionality is being tested after replacement of thyratron and the power supply board. A test will be performed to see if the laser is working properly. (Copper sputtered with Mo sample): The nitrogen and tape test has been performed. No observable impact by eye or SEM. The Mo thickness is estimated to be 22um. This proves that sputtering of Mo on Cu is a good method to deposit multi-alkalines on the copper inserts for the 704 MHz gun cathode. The next step will be to deposit a cathode on these pieces and measure its performance. The metal cathode laser cleaning chamber has been assembled and leak checked. The chamber was pumped by a turbo pump overnight, without bake out, and yielded low -10^8 vacuum.

Vacuum:

1. The FPC's were installed on the gun. The bolts were tightened to 240 in-lbs where gaps of .009" and .011" remained. This final torque was carefully chosen after performing a test on a standard flange set and gasket to bolt failure. The flanges were leak tight after bagging in He for 10 minutes. The cavity has been vented and will be delivered to the mechanical support group. A detailed summary of the FPC gasket modifications and installation will be generated.
2. Detail design of the ERL zig-zag chambers continues. Drawings have gone through the first round of checking. The horizontal aperture reduction to improve mechanical design has been accepted and is being incorporated into the models and detail drawings. Procurement documents have been reviewed and released. A PO is drafted and awaits final signed off drawings to complete the RFQ.
3. Survey has marked the Laser transport beam line and optics tower. All components staged and waiting anchor drilling which will be followed by transport line installation.
4. Laser mirror assembly awaits redesigned ring shims from Central Shops to complete the laser mirror assembly.
5. Designing an alternate e-gun HOM Damper impedance bridge between the ceramic and metal cuffs. This may be pursued in parallel to the conductive painting option. Either solution will still require sputter coating of the ceramic.
6. Particle free QA complete on 1 of the 2 pepper pot assemblies. The pepper

pots require disassembly to complete particle free processing to acceptable levels. The welded bellows requires ultrasonic wet processing to achieve ISO class 5 particle free cleanliness. The 1st unit is reassembled. And the 2nd is undergoing disassembly for precision cleaning. Upon completion of precision cleaning of both pepper pots, the units will be leak tested and one of the units will be vacuum baked at 200C.

7. Four halo scrapers have been received into the 905 clean room high bay area.
8. Deposition system UHV processing is complete except long arms still require disassembly, vacuum firing and reassembly. System reassembly will follow.
9. Modification of vacuum controls and vacuum interlocks of the cathode cart to deposition system/e-gun are under consideration.