

Accelerator Systems Division Highlights Ending October 17, 2003

ASD/LANL: Warm Linac

HIGH-POWER RF (WBS 1.4.1.1)

Accomplishments This Week: (1) *402.5-MHz E2V klystrons:* The factory acceptance test of serial number 5 scheduled for the week of Oct 27 will probably be delayed at least a week due to problems with their test stand. (2) *805-MHz, 5-MW Thales klystrons:* LANL staff is scheduled to witness the factory acceptance tests of the second 5-MW tube next week. (3) *805-MHz, 550-kW Thales klystrons:* We received an updated schedule for the remaining tubes. LANL staff is scheduled to witness the factory acceptance test of serial number 7 next week. (4) *805-MHz, 5-MW Sure-Beam loads:* We are progressing with testing a second load this week. (5) *805-MHz, 5-MW AFT circulators:* We began testing the 5-MW circulator, but the return loss was not within our specification (see below) (6) *402.5-MHz, 2.5-MW AFT circulators:* We plan to begin testing the last 402.5-MHz circulator today. (7) *SC transmitters:* We wrote checklists for tests to be done following installation at ORNL and after the klystrons are installed.

Concerns & Actions: (1) Two Sure-Beam reps are scheduled to come to LANL next Tuesday to address the load failure. (2) We are working with the circulator vendor AFT via telephone on the return-loss problem. We changed some circulator parameters and found a flex piece of waveguide with a high VSWR.

HIGH-VOLTAGE POWER CONDITIONING (WBS 1.4.1.2)

Accomplishments: (1) The prototype HCVM supported operation of the 5-MW, 805-MHz klystron, and the production HVCM supported operation of the 2.5-MW, 402.5-MHz klystron. (2) We have continued the analysis of harmonic-trap networks necessary to reduce 20-kHz and higher order harmonics. This has led to a design that modeling shows can achieve ~74 dB rejection for a given (20 kHz) harmonic. This modeling uses the most probable cause of the ripple, skews in IGBT timing. The network should fit under the existing HV output connectors. We already have a solid model of the required network, but will require some changes to accommodate the updated design. (3) We investigated HVCM order issues concerning quantity of spares and insulating fluid. (4) We debugged a trip issue with the production init SCR controller (see below). (5) We are working with Sorrento (old Maxwell) on the capacitor design necessary to facilitate the trap network.

Concerns & Actions: (1) The production SCR controller is again having problems. It seems control logic within the unit can cause the capacitor banks to dump, and then restart, without proper time-outs or latch-out functions, potentially causing over-heating and loss of the bank dump resistors. At the end of the week, the Dynapower engineer sent updated PLC code to LANL and ORNL to fix this problem. (2) We are analyzing IGBT performance requirements necessary to facilitate HVCM operations with adaptive DSP controls. The present operations seem to indicate an energy loss of ~1.23 J per pulse (~2 kW IGBT loss). Thermal cycling and die lifetime data seem to suggest that ~2.5 J per pulse (~4 kW) would ensure long device life. Recent modeling suggests that we would remain under 4 kW per IGBT with DSP controls. The other concern is the temperature of the IGBT bypass capacitors. We are planning a trip to ORNL next week to examine HVCM operation with DSP controls. Thermal performance will be analyzed with reduced conduction angles before DSP control loops are closed.

DRIFT-TUBE LINAC (WBS 1.4.2)

Accomplishments – Tank 2: Profile machining of all groups is complete, and they are either enroute or at Los Alamos for leak checking. Three of group M are showing severe leaks from water channels (10-3 range); this is likely due to the crater cosmetic pass not being done .020" away from final profile. Groups K, L and M all likely suffer from this flaw, and some of group J. All Tank-2 units will be baked and returned to ESCO for another cosmetic pass the middle of next week. If the profiles following the cosmetic pass are not deemed satisfactory, we have the option of plating and clean-up machining. If severe eruptions occur during the cosmetic pass, then ring repairs will be required.

Tank 5: Stem straightening was delayed until early this week; units will go to plating Friday with delivery to Los Alamos for final processing delayed to next week. This will push final processing to late next week (October 23-24). Counts of Tank-5 top hats vary by two units between Los Alamos and Oak Ridge; we are looking for missing top hats here in New Mexico. Tank-5 DT water-manifold fittings and other hardware are being packed for shipment.

Tank 6: All units with the exception of 6-17 are undergoing stem welding Thursday and Friday. Unit 6-17 has been weld repaired and leak checked at Los Alamos and will be sent to CMI for final profiling. Tank-6 DT water manifold fittings and other hardware are being packed for shipment.

EMD and BPM DTs: All repaired EMD drift tubes passed leak checking at Los Alamos. EMD DT units 3-26, 5-13, 6-12 and 6-18 are plated and ready for final processing. Plating is underway on EMD DT units 3-29, 4-18, 4-27 and 5-22. Final mechanical inspection is complete on EMD DT units 1-49, 2-39, 2-45 and is in process for 3-32 and 4-24. Final machining is in process on EMD DT units 3-23, 5-16, 5-19, 6-15, and 6-21. EMD DT's 1-52, 1-55 and 1-58 are waiting for final machining. All BPM DT's are leak tight; six units are in mapping; two are in final machining stage, and one is waiting for final machining. However, on the afternoon of October 16 BPM DT 3-4 experienced a machining tool crash at the nose end, which will require e-beam welding a repair ring onto the nose and cleanup machining. Qualification parts for this repair are being made and arrangements for welding at Sciaky next week are underway.

Concerns & Actions: (1) There are leaks in three of the Tank-2 group-M drift tubes and likelihood of a systematic problem. As described above, repair welds are underway. (2) The Oct 17 ship date for beam boxes 1/2 and 2/3 will not be met, and machining progress on pumping grills and cover plates is undetermined (vendor merely states grills and plates are on machine). The matter has been turned over to procurement for resolution, but we are closely following the issue. (3) There is a mismatch between DTL recovery-team personnel planned departure dates and drift-tube completion dates caused by fabrication delays at Hanford, ESCO and CMI. It is increasingly difficult to staff all work and monitor fabrication operations with the personnel remaining. We are extending several key personnel to alleviate the problem.

COUPLED CAVITY LINAC (WBS 1.4.4)

Accomplishments: (1) LANL and ASD personnel were at ACCEL this week for Module-1 tuning. We continued the first full-module bead-pull and tilt-sensitivity measurements. Progress is steady; latest results indicate that even with a stop band of 211 kHz, the structure is very stable. (2) Current plans are to complete tuning of Module 1 next week. Following the final leak check, and barring unforeseen problems, the module will ship by mid November.

Concerns & Actions: We held the first weekly status conference call with ACCEL management this week. Prior to the call, LANL staff at ACCEL forwarded a detailed MS Project schedule being used by ACCEL to track fabrication and tuning tasks. They also produced a segment manufacturing checklist to track fabrication at a more detailed level, and they worked with ACCEL staff to improve the tracking process and devise plans to recover some of the schedule delay. With this information in hand, the first schedule status call was quite successful. ACCEL will increase segment brazing from 2 to 3 per week, and they believe they can meet the Module-2 delivery within one week of the Dec. 31 scheduled date.

PHYSICS AND DIAGNOSTICS (WBS 1.4.5)

Accomplishments: (1) We successfully mapped four DTL BPMs within the completed drift tubes. Three more are being terminated for mapping, and the final three BPM drift tubes are being final machined. (2) We received the last shipment of Quick Logic gate arrays for production of the remaining BPM electronics. (3) We shipped all DTL current-monitor hardware to ORNL this week. (4) We received the certification from the vendor Huntington for the first-article DTL and CCL wire-scanner actuators; we are continuing to check these units at LANL. (5) We delivered six more wire-scanner electronics systems to ORNL this week, and eight more are being prepared for shipping next week. This will fulfill our scheduled wire-scanner electronics deliverables for October (for the DTL and CCL).

ASD/JLAB: Cold Linac

Repair of the 1 MW RF Test Stand is complete. The stand is back in service, processing fundamental power couplers.

CTF operations have fully resumed. Testing of two of three cavities prepared before the hurricane has been completed. One of the electropolished high- β cavities has been qualified for string assembly. The M-5 cryomodule has been cooled to 2 K in preparation for resumption of testing.

Modifications to the chemistry cabinet to provide an engineered barrier to the sort of acid exposure reported last week are underway.

Assembly of the M-7 cryomodule is underway.

The external review of the JLab SNS cryomodule effort was completed this week. The review committee prepared a list of recommended process improvements. JLab will implement those improvements in coming weeks.

ASD/BNL: Ring

H. Hseuh visited with ASD this week to review our internal schedule for production and delivery of Ring vacuum components.

N. Holtkamp was at BNL to meet with Project staff and Lab management.

W. Eng is on travel to IE Power for engineering acceptance of two injection kicker power supplies.

The first article 26S26 production magnet arrived at BNL from Alpha Magnetics. The magnet is being prepared for production measurements.

New England Technicoil (NETC) plans to ship four (4) 27CDM30 magnets to SNS/OR on October 21.

Tesla plans to ship eight (8) more 21Q40 magnets and stands to SNS/OR on October 24.

The first RF cavity and associated equipment is fully packed and ready for shipment to SNS/OR early next week.

Momentum collimator - We are working to optimize the position (lateral off-set) of the momentum collimator and shielding. Its present location is based on ray tracing of off momentum particles in the magnetic (2D) field. AP will confirm optimum location with ray tracing using 3D magnet modeling.

A trial assembly of our first quarter-cell was successfully completed.

A trial assembly of our first quad doublet was successfully completed.

Controls

A number of network switches were installed in the CCL and SCL areas in preparation for a visit by Kay Kasemir (LANL). Kay plans to install and test of SCL and HPRF control software.

Our campaign to finish timing system hardware procurement continues:

- The V294 (VME-format fanout module) first article has been tested and approval given to build the remaining 49 modules.
- The first article of the V108s (VME utility modules) is undergoing testing. Everything looks good so far.

“Group 3” remote I/O modules were made to work with EPICS R3.14.4 this week. This is the first control of hardware using R3.14.4 here in Oak Ridge for SNS, and so it is a first step in the migration path to use of R3.14.X. Communications for both a CNA and a CN3 module with binary input and analog input (2) boards was demonstrated.

Installation

Craft Snapshot 10/14/03

| | |
|--------------------|------|
| ASD craft workers | 53.0 |
| Foremen, ES&H, etc | 9.0 |
| Less WBS 1.9 etc | 8.0 |
| Less absent | 5.0 |
| TOTAL | 49.0 |

The third MB Cryomodule was received from JLAB. It will be checked by Survey and Alignment before it is moved to its position in the linac. The next cryomodule is expected in ` 3 weeks.

Leaks have been found in the DTL#2 drift tubes. Their delivery will be delayed pending repair. The cosmetic e-beam pass will be attempted first ~1 week. If that process is not successful the rings insert process may be necessary ~4 weeks. The installation schedule for DTL #2 is being impacted.

DTL #2 cabling is complete

The DTL #2 klystron has been tested.

The LLRF system on DTL #3 is complete.

Calibration on the DTL #4 klystron is complete. High power testing is the next step.

DTL #5 calibration is complete. High power testing will begin on it next week as well.

LANL has received a detailed CCL schedule from AXCEL. It is under review.

The HVCM for the first SCL RF systems is on track to be completed by the end of Oct. It will be ready for testing into a resistive load.

The HEBT hoist will be installed next week by Blain.

The 12th ring half cell will be delivered before the end of Oct.

The ring RF cavity will ship from BNL on Monday, Oct 20, 2003.

LANL Controls personnel will be at SNS next week to work on the SCL ME 01 system.

The first acceptable CCL Klystron is now projected for the third week in Nov, 2003.

RFQ

As we were unable to find unambiguous cause of the RFQ frequency shift without breaking the RFQ apart we decided to retune it back to the nominal frequency and realign field distribution along the RFQ. To save time and efforts we decided to use 48 pick up loop in the RFQ walls instead of bead pull measurements. Original adjustable tuners were found at Berkley and sent to us. We received the tuners and installed 36 of them (out of 80) to positions, which we expected to be the best for field and frequency shift compensation. Some modification to standard tuner fixture was required and was successfully made by Rob Morton. We used original John Staples's tuning code which predicts tuner effect on field distribution and frequency. After 7-8 iterations we were able to restore field within +/- 3% from nominal, which is good from beam dynamics point of view. Further improvements are limited by our measurement accuracy. Resonant frequency shifted to 402.380MHz, which is 50kHz below nominal (adjusted for air in the RFQ cavity). Very slight tuners adjustment is under way. As soon as we done with the retuning the fixed tuners of a proper size will be machined and installed in place of adjustable tuners.

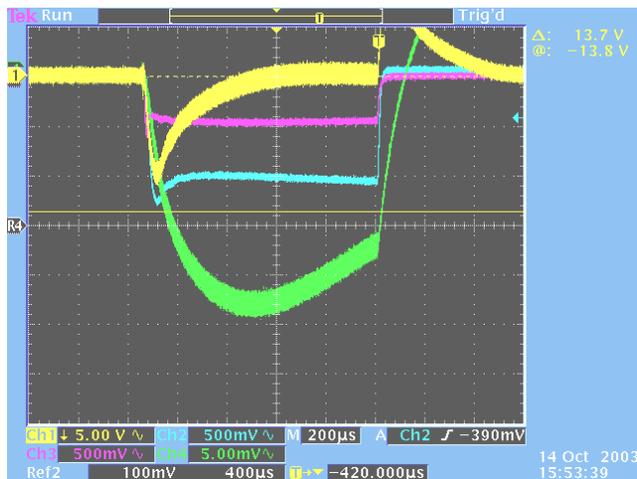
Accelerator Physics

Operations Group

Ion Source Group

The Hot Spare Stand has been started up again after installing a repaired and improved RF cable and after installing a Spellman high voltage ripple monitor. The new monitor measures changes in the ion source voltage shown as yellow trace in the figure below. As expected, the ~ 100 pF stray-capacitance of the ion source starts to discharge at a rate of about 250V/ μ s when starting to extract 10 mA H-current (purple trace) and 20 mA e-current (blue trace). The measurement shows that the Spellman SH70N110 supply needs about 0.5 ms to restore the desired voltage

level. The observed voltage error can be reduced with any of the following methods: The least effort solution is to start the ion source about 0.5 ms before starting the RFQ. This increases the ion source duty cycle to 9%, which could shorten the ion source life time. For about 5 k\$ one could add a $\sim 0.5\mu\text{F}$ capacitor and a fast high voltage thyristor switch that disconnects the capacitor when an arc is sensed. This would practically duplicate the DTI supply that is currently installed in the Front End. The DTI's $0.5\mu\text{F}$ are the root cause of the violent discharges that have plagued the Front End, especially after the broken fast switch was removed. The Spellman SH70N110 installed on the Hot Spare Stand has a sophisticated arc quench and protection system that minimizes arc induced EM emission and the resulting problems. Therefore we prefer to try a feed-forward technique to speed up the supply's response time. These efforts are well justified by the improved equipment safety as well as the cost factor (Spellman 15.2 k\$ versus 150 k\$ for a duplicate of the custom built DTI supply). The green trace is the signal from the current transformer monitoring the supplied HV current, which shows why it cannot be used to measure the delivered ion current.



Survey and Alignment

Continued setting / alignment of HEBT stands

Laid out bolt hole pattern and measured elevations on Momentum Collimator concrete pad.

Continued with fiducialization of DT-Tank-4 Drift Tube Magnets

Verified the location of the RFQ

Started the mapping of newly arrived CCL magnets.

Survey and Alignment reduced the latest epoch of RTBT deformation monitoring data and found that the downstream RTBT tunnel has sunk 16 mm during the last 30 days. The settlement was caused by the backfill operation alongside the tunnel – the level of backfill is now almost to the height of the tunnel roof.

Again, this week the Survey and Alignment group was busy with XFD. Not only were we meeting with Target group but also with some of the beamline Scientist and Engineers.

First, we needed to re-mark our reference points out in the target hot cell. These reference points represent the "F" line which is what the target and ancillary equipment layout is based on. This remarking was on the spur of the moment. We had reference targets already marked and protected when one of the site surveyors relayed to us that construction personnel were about to remove these reference targets. To note, from the time we had installed these reference targets, we had the assurance from higher ups that our targets would be protected and there was no worry. Had it not been for the heads up of this person, we would have had to reestablish the "F" line which would have taken a considerable amount of time.

Second, we met with Target to discuss what their requirements are from us for the near future. We are looking at making a several core vessel measurements along with laying out beam lines two and four onto the instrument floor.

Third, we met twice with Scientists and Engineers from beam lines eleven and eighteen. We discussed with them alignment needs for their beamline components. Although their beam lines will not be installed for another two years, it is beneficial when they consider alignment needs and processes early in the planning stage. The two meeting went very well and we accomplished much. They will now write up preliminary alignment strategies for our review.

Mechanical Group

Fifteen of the 21 DTL-4 PMQ and empty DT's have been fiducialized. The remaining 6 will be completed this week. Our taut wire system (used for fiducialization) indicated that the magnetic centers of two DT's were offset from the geometric center by 0.010" and 0.030" (more than the allowable value of 0.005"). After double checking the values it was determined that the micrometer slides used to position the wire were not functioning properly which resulted in incorrect readings. The slides have been cleaned and realigned and are again working properly. All DT's suspected of fiducialization errors will be rechecked this week.

The o-ring grooves in the ends of the DTL-5 tank sections are being nickel plated this week. This plating is for corrosion protection of the bare grooves in the carbon steel tanks. Assembly of the tank sections is planned for next week.

Water Systems Installation

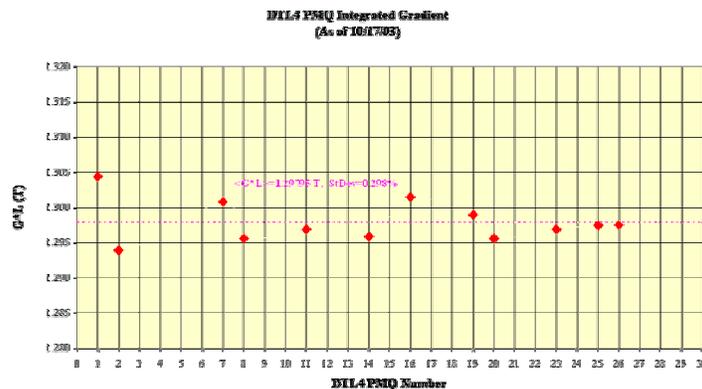
- The feed piping from facility to QMCS RCCS has been completed
- Installation of SCL ME-01 piping was completed, pressure and leak testing is in progress.
- Fabrication of the QMCS manifold continues in the Linac tunnel.
- Started CCL-2 HVCM and SCR-cabinet piping.
- The entire Klystron gallery DI water systems are charged and in service, DI water is now flowing through the DTL, CCL and SCL-ME01 systems.

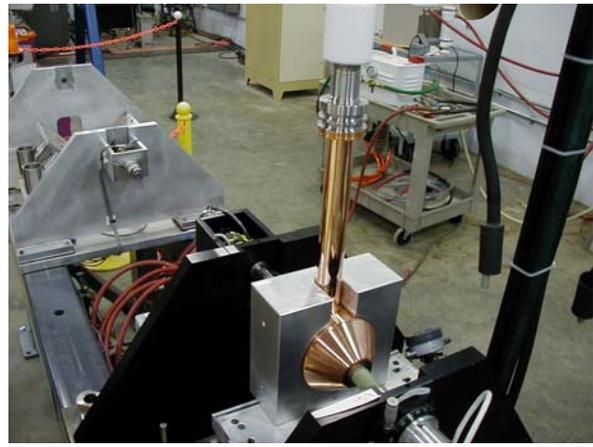
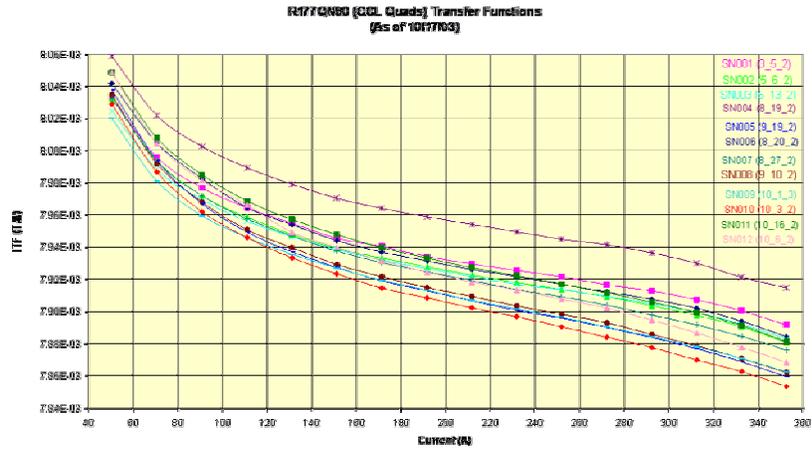
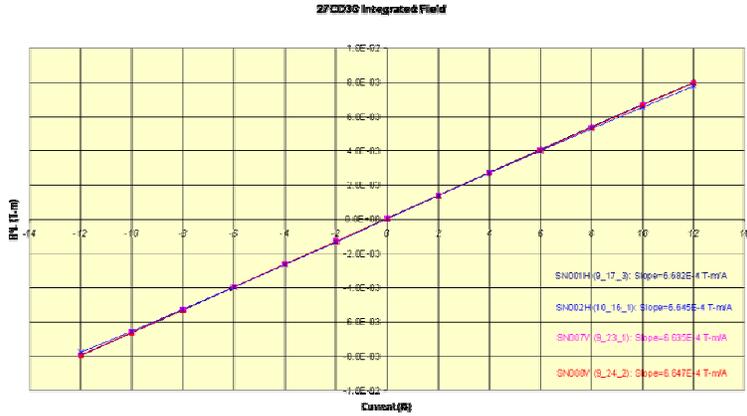
Ring Systems Installation

- Installation of HEBT beamline vacuum drift pipe chambers continues.
- Installation of RING cabling continues.

Magnet Task

The attached JPG and enclosed charts detail our accomplishments in the last week. We have measured 12 Tank 4 PMQ's, four CCL Quads, and total of four 27CD30's. We are also setting up our measurement system for 21Q40's. We have a 21Q40 installed in the system, have hydrostatically tested it, and Error's group is aligning the system.





Electrical Group

All modulators were shutdown yesterday for approximately 2 hours to respond to a potential equipment safety issue experienced at LANL. Inspection of ORNL unit indicated the problem did not exist in our installations, and so authorization was given to re-energize the units at 5:15 p.m. Some design changes will be required, which we are investigating.

Due to the RFQ problems and unavailability of operators during off-hour shifts, HVCM operation was curtailed. The HVCM group did provide support for checkout of DTL2 and DTL4 klystrons.

Operation on DTL-ME3 was terminated midweek to allow for installation of enhanced diagnostics to aid in our Pulse Width Modulation (PWM) studies next week. We hope, with LANL's and Ztec's help, to be able to characterize the safe operating region to keep IGBT switching losses at a reasonable level while still providing some PWM control margin.

Checkout of SCL-ME1 began this week, with the majority of the SCR Controller checkout completed. Discovery of two bad IGBT drive PCBs required us to terminate the effort early while the boards are being repaired.

Tested the remaining 6 corrector power supplies to be installed in the HEBT Service Building and the first 6 corrector power supplies to be installed in the Ring Service Building.

The circuit breaker on each of the 41 SCL quad supplies was found to have insufficient inrush current rating, causing the breaker to trip occasionally on turn on. The manufacturer supplied a correctly rated breaker. This was installed and tested in an SCL power supply and solved the turn on trip problem. The manufacturer will supply replacement breakers for the remaining 40 supplies.

Noise problems in the computer output current readback have slowed the testing of the CCL quad supplies. These problems appear to have been solved with additional cable shielding/grounding between the power supply and the power supply interface unit. Testing next week should resolve this.

DTL-2 tank wiring completed

DTL 5&6 beam line interfaces for RCCS and vacuum instrumentation complete (DTL-4 is the only one to be complete after the shielding wall is removed)

SCL-ME1 modulator power cabling and check out completed

Ring sextupole and quadrupole 535MCM pulls continued

HPRF

LLRF

The EPICS sequencer for the Field Control Module (FCM) has been tested successfully in the lab and is ready for installation, along with the FCM, in either DTL1 or 3. We plan to install and operate a FCM in next week, operations schedule permitting.

Implementation of a full length (1.3 ms) feedforward buffer on the FCM is in progress. This requires FPGA and IOC code modifications. An increase from 50 us to 800 us in the buffer size has been achieved this week and performs as expected.

The procurement of electronic components for the FCM and High Power Protect Module (HPM) production is in progress. Many parts are already on order and will begin to arrive next week.

We continue to support operation of DTL1 & DTL3 as necessary. We are supporting the testing of RF systems for DTL2 and DTL4-6.

The phase matching and terminating of Cavity and Reference heliax cables in the DTL was completed. Termination of heliax cables in the CCL is in progress. Fabrication of downconversion/distribution chassis for the CCL is in progress. The Electrical Group's research mechanic worked with us all last week on the aforementioned tasks. The drawing package for the SCL downconversion/distribution chassis is in progress and will be finished by the end of October. These 41 chassis will be fabricated by industry.

Hengjie Ma will attend a 5-day VHDL design course next week.

Sung-il Kwon of LANL visited ORNL 10-16 and 10-17 and performed system characterization measurements on DTL1.

Kay Kasemir of LANL will visit ORNL next week.

Cryosystem Group

Work continues preparing the warm compressors to receive the oil charge. The 3 way ball valves were leaking and preventing calibration of some instrumentation have all been replaced and calibration has commenced.

Dan Hatfield and Matt Howell are at JLAB assisting with the restart of the CHL. The work is progressing well and they should be returning by the end of the week.

Beam Diagnostics

BNL SNS Beam Diagnostics Progress Report:

1.5.7.1 BPM: First article RF AFE board received from the vendor (pictures attached). BNL made the command decision to go with copper (vs. fiber) on the timing link for the combined baseband/PCI AFE/digitizer board. Layout is complete; board is going out for fab. The few remaining parts for this board have been ordered.



1.5.7.2 IPM: Preliminary IPM vacuum chamber drawings were done on AutoCAD. As per the SNS requirements, these drawings are being switched over to ProE at an early stage to save time as the drawings become more mature. The two main unsolved challenges of the detector head design are a radiation-hard collector circuit board and electrical insulation to stand off 30kV for the transverse collection field. The first RHIC collector boards were 99.9% alumina made by Raytheon Electronics Systems. They have been contacted but they no longer do this type of work. A circuit board shop looked promising in California but they have stopped responding to our inquiries. The electrical insulation problem is not solved. The second PCI crate and computer has been received for the data acquisition system. The order for the digitizer cards is in the Chicago DOE office pending a Waiver of the Buy American policy.

1.5.7.3 BLM: Beam Loss Monitor System testing was done with beam recently at ORNL. Purchasing is working with LND on placing the order for the 295 ion chamber detectors, there were discussions about a price increase since the order was placed so long after the now expired quote received in March. We have received the stuffed pc boards from the local vendor for the ion chamber end cap assembly. We will ship the kits to LND soon so they can complete the 30 units previously ordered. The AFE chassis parts (quantity 14) are with the local vendor as they progress with the assembly. A BNL representative visited the vendor to answer questions and review the progress. The AFE back plane PCB will be fabricated next week. The AFE module revisions are still in the design room job queue due to higher priority RHIC design jobs. The MPS I/F VME module front panel layout drawings are being finalized. We have received 10 more ISEG VHQ bias power supplies; these will be tested here before they are shipped to ORNL for installation. Discussions continue with Mike Plum regarding details of the detector locations throughout the facility. Mechanical drawings are being generated for the moveable BLM stands. The parts which need machining will be sent to the shops for completion. Progress continues with Controls on improvements to the LabVIEW VI for the ion chamber detector ATE system.

1.5.7.4 BCM: RFQ problems have upset operations. Two BCM PCs have been received by ORNL. We await beam. The assembly of three additional BCM boards is now in progress (we are holding off on full production pending resolution of the mysterious component failure problem at ORNL). Signed off RTBT BCM dwgs. Resumed the design work for the Ring BCM. Performed structural analysis to confirm the housing design. Layout of the calibrator board continues. Refinement of the LabVIEW software is in progress. Downloaded Wim Blokland's Fast Data Acquisition programs (DCBM & daqDP240) and began review.

1.5.7.5 Incoherent Tune: Detailed design of QMM pickup/kicker continues. Submitted PO for outer housing of all kickers.

1.5.7.6 Wire Scanner: Design work continues on Ring and RTBT dump wire scanner vacuum chambers. Performing structural analysis on the current design.

1.5.7.7 BIG/Coherent Tune: Revising the kicker design to be more serviceable in the field following comments from the vacuum group. Design work will resume after finishing the RTBT wire scanner design. Submitted the PO for the outer housings.

LANL SNS Beam Diagnostics Progress Report:

Ross Meyer reported that the following DTL current transformers will shipped to the ORNL next week.

(1) insulator seal, MDC, part # 1063801

(6) vacuum tees, MDC, part # 404044

(14) insulator seal, vacuum feedthroughs, MDC, part # 9252002

(7) coils, GMW Associates, model # FCT-029-50:1-LDH, serial #'s 482, 484, 485, 486, 487,489 & 505. The last two DTL beam boxes will shipped to the ORNL around December-15th.

ORNL SNS Beam Diagnostics Progress Report:

General:

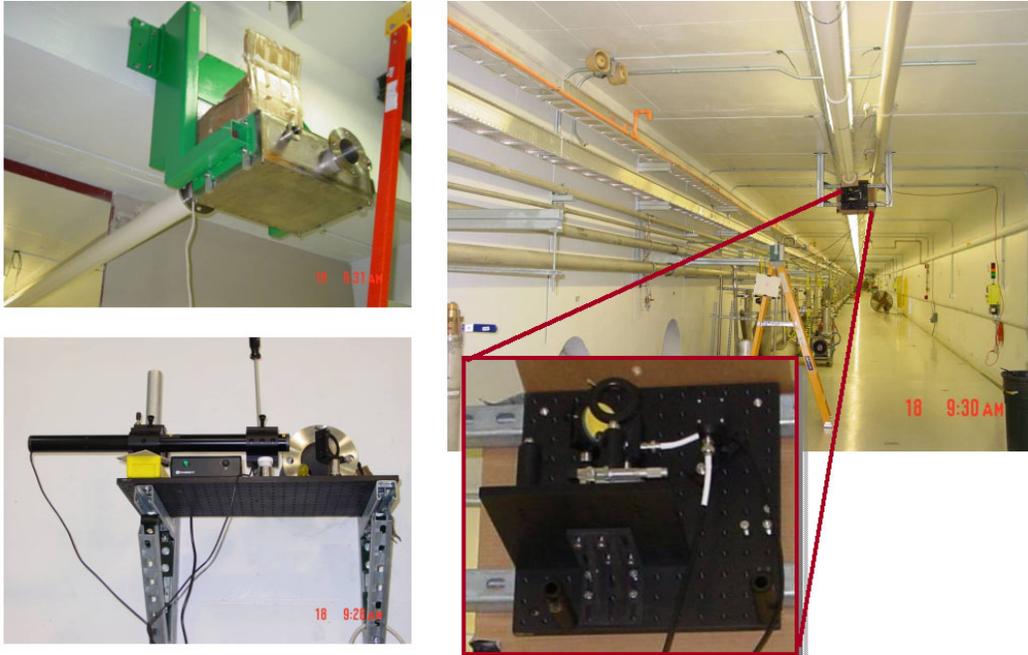
Two test stations (BPM and BCM) are fully assembled in the Mezzanine and are ready for receiving and testing electronics. Laser magnet mapper and the BLM test stations are under construction.

The order for the wire scanner actuators has been transferred to ORNL. Technical responsibility for the system remains with LANL.

An interrupt capability has been added to the embedded timing circuit at the request of XFD. Rick Riedel is testing and refining his kernel mode driver.

Tom and Dave attended ICALEPCS in Korea. Dave's talk on the SNS database was well received. Tom presented a talk for Dave Thompson and Wim Blokland on the LabVIEW-EPICS interface. There is enough interest in this to merit a place on our website for current software and documentation.

SCL Laser Profile Monitor: We are hoping to install the laser profile monitor transport-line. Progress is slow but steady due to the availability of proper labor.



Laser vibration setup.