Accelerator Systems Division Highlights for the Week Ending October 25, 2002

ASD/LANL: Warm Linac

HIGH-POWER RF (WBS 1.4.1.1)
Accomplishments this week: (1) Completed 36-hour heat run at full pulsed power and duty factor on the second 805-kHz, 550-kW CPI klystron and a 550-kW load; (2) started 96-hour heat run at full pulsed power and duty factor on fifth 402.5-MHz, 2.5-MW klystron, a 2.5-MW load, and two DTL windows; (3) accepted sixth 402.5-MHz, 2.5-MW klystron at factory; (4) sent team (led by D. Rees) to ORNL to assist in RFQ transmitter checkout and turn on.
Concerns & actions: (1) Installation of untested high power RF equipment at ORNL – received commitment from ASD to regularly send 90-day look-ahead for high-power RF equipment installation; (2) Risk to klystron from untested high-voltage converter modulator – expressed concerns to ORNL, offering shielding material to insure use of the Marconi beam stick prior to use of RFQ klystron; (3) We also shared with ASD two concerns regarding treatment that the 402.5 MHz klystrons are receiving during installation. First, non-negligible quantities of pipe dope are being used to make seals on klystron or its associated water manifold. Marconi personnel observed failures from pipe sealant contaminants in the water system, and formed a film on the critical heat-transfer surfaces, resulting in overheating and loosing vacuum. Second, one needs to guard against over-torque applied to the water fittings, which can open water or vacuum leaks in the klystron. We recommended more thorough training to the plumbing installation crew.

HIGH-VOLTAGE POWER CONDITIONING (WBS 1.4.1.2)
Accomplishments: (1) Sent team (led by W. Reass) to ORNL to assist in installation and turn on of the RFQ high-voltage converter modulator – system ready for further checkout after 13-kV power, rack control power, and cooling systems are available; (2) Reass was also at Dynapower to prepare the second HVCM for high-power testing, scheduled to begin today and continue through weekend.
Concerns & actions: (1) Untested oil tanks were prematurely shipped to ORNL from Dynapower – Dynapower started dye penetrant on nine unpainted tanks with satisfactory results, to date. (2) Installation labor at ORNL were inappropriately standing on top of the RFQ HVCM safety enclosure – we communicated safety hazards and equipment risks to ASD, and requested better communication and labeling to help prevent reoccurrence.

LOW-LEVEL RF CONTROLS (WBS 1.4.1.3)
Accomplishments: (1) shipped HPM Rev D module to ORNL; (2) with ORNL and LBNL, conducted a meeting at LBNL to select architecture for the ultimate LLRF system.

DRIFT-TUBE LINAC (WBS 1.4.1.2)
Accomplishments: (1) Jim Sims was named the new work package manager for the DTL effective 11/4/02; (2) preliminary machining of the DTL Tank-1 drift tubes that were repaired with the ring weld looks quite promising; (3) a concept for rebuilding the T-1 drift tubes has been developed and process drawings are being prepared for discussion with the vendors; (4) Rudy Damm visited LANL to consult with the DTL team on the repair and production of the drift tubes. Discussions with Rudy were very profitable and it was agreed that he would continue to visit Los Alamos to provide his considerable technical and management insight to the DTL team on a periodic basis to support the drift tube production effort; (5) prototype tanks have been successfully plated at GSI and plating of tank 4 is ready to begin; (6) redesigned dovetail o-ring groove with 25% compression was successfully tested at ORNL and tank 1 is being machined to reflect the new o-ring groove geometry.

COUPLED-CAVITY LINAC (WBS 1.4.4)
Accomplishments: LANL and ASD completed their visit at ACCEL and MCE. Despite some difficulties, they were able to accomplish nearly all of the original goals as desired. (1) Bridge coupler #44 was tuned completely; (2) an initial trial stacking was completed with very positive results. The stacking activity using the LANL-supplied fixtures and the process of isolating and identifying the various modes in the assembly was accomplished fully. The incomplete endwalls (see below) had some affect on the process but it was relatively minor. The equator flatness repair that was done in the ACCEL shop was very effective. ACCEL will repeat the process with the actual production hardware when it becomes ready. We expect that only a simple teleconference will be needed at that point to confirm the cells ready for machining. The mode spectrum looked very good; the system Q was measured at 11,800 and the interior cells were all within 200 kHz of each other. This indicates that the cells (which were machined at ACCEL) are extremely consistent in size and that the equator surfaces are extremely flat as desired. (3)

Document review and release was completed as desired. Document release level "E" was reviewed. This process included review and drawing crosscheck for all Engineering Change Notices (ECN's) to date. In addition we discussed the inclusion in this release of all remaining water line drawings for the segments in Module 2-4, updated and signed the spreadsheet modifications for the BC nose length correction discussed above, and reviewed outstanding action items.
Concerns & Action: LANL rejected the two CCL endplates at MCE. Plans put into place should resolve the problems but it will take a couple of weeks to implement the required fixturing associated with the plan, and then they still have to remanufacture the two parts for the first segment before we can meet the full first article requirements. Manufacturing of these copper parts by any organization forces a very disciplined approach to fixturing and handling that in most cases has to be learned as a result of failing on the first couple of parts. We saw the same thing evolve at Coronado on the Hot Model and initially at MCE on the septum machining in February.

ASD/JLAB: Cold Linac

Remaining equipment for the 4.5 K cold box has been received at SNS. This includes four trucks of platform structure, panels, spare parts and turbines needed for cold box reassembly work. The vendor is sending 6-7 reassembly personnel to SNS on Monday, Oct 28 for approximately 4 weeks of work. Bill Chronis will be representing JLAB on site for the beginning of the work. Flex hoses for the cold box 80K/20K regeneration vaporizers were sent to SNS.

Cavities MB02 and MB03 were successfully cold-tested, achieving specified Q_0 and gradient. The helium vessel has been welded on MB01. MB04, 06,07 and 08 have been received. All have passed incoming QA, including both RF and mechanical inspection. MB06 and MB08 have been degreased. MB06 has been heat treated, and heat treatment of MB08 is underway.

The prototype cryomodule completed its transport test with no evidence of any negative impact. The mechanical alignment was still within specification. Cooldown to 2 K proceeded without incident. Cavity resonant frequencies were unchanged. RF tests were conducted with the 20kW cw system and a waveguide-matching network to improve coupling in the absence of beam. No Fundamental Power Coupler reprocessing was necessary, as no gas evolution was observed, in spite of a maximum equivalent peak power in excess of 250 kW. Q_0 measurements are much more difficult without the 1 MW RF test stand, but will be attempted. The first cavity tested achieved the same maximum gradient, within measurement error, reached prior to the road test. Further tests are ongoing.

ASD/BNL: Ring

A contract was awarded this week to Applied Power Systems (APS) of Hicksville, New York, for the extraction kicker PFNs. With the award of this contract, all Ring System power supply orders have been placed with outside vendors.

Preparations are underway to begin testing RF cavity #1 next week. Assembly continues on the other three cavities.

Work continues on the assembly of half-cell #1. Survey is complete and has been approved. Installation of the vacuum chamber is complete. A carrier has been contracted for shipment to SNS/OR. Pick-up at BNL is scheduled for Tuesday, Nov. 5. Magnet acceptance and review of all assembly, test and survey data is in progress.

Work is underway to satisfy ASD's Documentation Summary requests for the DOE Review. This includes:

- Component drawings of the HEBT, Injection, Ring and RTBT have been sent to ASD via IMAN.
- Installation drawings of the HEBT, Inj. Area, Collimator straight section, RF straight section, Ring and RTBT are being exported to ASD via IMAN.
- Ring Lattice Drawing
- Magnet Assembly spread sheets for half cell assembly and location within the Ring.
- Spare parts update.

Magnet assembly and measurements:

- Ring dipole measurements – All have been measured in the un-shimmed state (16 Left + 16 Right + 1 Left spare). Five now remain to be measured after shimming.
- 21Q40 – field quality measurement of quad #9 is complete. To date, eight of these magnets have integral fields within the desired range for Ring grouping.
- 26Q40 – has been measured with its modified pole chamfer. Awaiting a second test for final approval. Vendor (Stangenes) reported that 11 of 32 pole pieces are undersized in width by 15 mils. Options are being reviewed.
- 30Q58 – magnet testing is complete. Awaiting results of data analysis.
- 21CS26 – measurements underway; 4 are complete; #5 IP.
- 36CDM30 – 1st article rejected; returned to vendor.
- 41CDM30 – tested & approved for production. Vendor (Alpha) has been notified.

Vendor deliveries:

- Danfysik is preparing to ship the last five 12Q45 production magnets to SNS/OR.
- HEBT dipole #7 is en route to SNS/OR. Machining of dipole #8 is in progress.
- Seven more 21Q40 quads arrived at BNL this week. The last six (completing Phase I) are IP at the vendor's plant. Phase II production (30 additional) will begin in late October.
- Low Field Power Supplies – Danfysik reported that they plan to ship 15 units of 896 bipolar supplies this week. The next 15-20 units will be sent on Friday, Nov. 1, and then 15-20 units each week thereafter.

Controls

Effort was concentrated on meeting the requirements of last week's Accelerator Readiness Review (ARR). A list of action items was prepared in advance of the ARR's visit last week to be completed prior to handing the PPS for the Ion Source over to operations by October 29. This list included the following categories of action items:
1. Documents and Drawings
2. Procedures
3. Travelers
4. Testing
5. Certification of the PPS prior to operations

A few items were added as a result of the ARR committee report. We have been working to close out these items prior to the status report back to the committee on October 28.

The following is the status of these items as of Friday, October 25:
1. All documents and drawings are complete except for the SIL Basis document. This document is out for comment and needs signatures.
2. All procedures are complete. The OPM 18.* (pertaining to Chipmunk installation) procedures are in revision to make improvements based on items found during first use. The Chipmunks have been installed per approved procedures based on hand-processed changes.
3. All equipment travelers required for phase 0.0a (ion source) are completed except for QA approval that should be obtained Oct. 25.
4. All PPS integration testing and Chipmunk testing is complete.
5. The certification procedure for PPS phase 0.0a has been "dry run" twice. The procedure will be slightly revised based upon the dry run, which demonstrates that it can be successfully executed as soon as the Front End system is ready.

As mandated by the ARR, new Software in the Beam Current Monitor system calculates differential beam loss and sets an EPICS alarm when the loss is outside specified limits. The diagnostics group and BNL Engineers implemented this function.

Eight new MPS chassis were received from the vendor this week. Display boards for these chassis have not arrived yet. The MPS standard interface chassis for PLCs and some diagnostics limit switches is complete and tested.

The MPS PLC has been configured and set up in the Controls Lab for testing. Beam Mode and Machine mode are read from the PLC through EPICS, by the Timing master IOC. The timing master broadcasts these modes on the RTDL. The MPS Master reads the RTDL, and completes the handshake with the PLC, allowing the desired beam and machine mode.

The timing system hardware is coming together. Acceptance testing began on the Rev-B Utility module hardware and software. Sixteen V206 modules were received from Brookhaven (these are the 8-channel RTDL input modules). Beam and Machine modes can now be read from the PLC key-switches by the MPS system. The timing master reads the resulting MPS Mode channel and sends it out on the RTDL.

All five Berkeley low-level RF systems have been updated to the latest revision software, and are installed and running at the front end, with EPICS screens available in the Front End Control Room.

This week the BNL controls team met with the RF group and laid out the screens for the High Power RF control and monitoring. EDM screens will be developed in parallel with efforts to bring a ControlLogix PLC into the RF system.

The BCM Labview software was modified at BNL to provide the difference between two current monitors. The impetus behind this modification is to provide beam loss information required by the accelerator readiness review. The current difference is published as an EPICS process variable, using Windows-based IOC core.

At LANL, orders for all controls SCL cabinets are complete. A decision has been made to use Beckhoff I/O for the orphans and the superconducting linac vacuum. The performance is meets requirements, the configuration is satisfactory, and the savings are significant. Unfortunately, Paul Stein has decided to leave LANL to return to BNL.

Installation

Accelerator Physics

RF requirements for phase and amplitude stability have been obtained. We expect that with 1%/1 degree amplitude and phase stability that we can commission the machine to reach CD-4 goals. We expect that we will need better stability as the accelerator systems deliver higher beam power, so we recommend that LLRF systems should be capable of achieving 0.5%/0.5 deg for ultimate performance.

S. Kim, M. Doleans and D. Jeon are investigating SC cavity field flatness requirements from the beam dynamics viewpoint.

The ICFA Diagnostics for High-Intensity Hadron Facilities Mini-Workshop was held at SNS this week and several AP group members participated. J. Galambos was co-organizer of this workshop.

Ten AP group members have been receiving extensive training this week on operational procedures as part of the Operator Training necessary to satisfy the ARR requirements.

Operations Group

The Operations Group spent the week and weekends responding to the ARR Committee punch list. On Monday afternoon, October 28, ASD received permission to commission the front end after the completion of a five-item punch list that should be completed within about a day. This work and resulting decision by the ARR Committee will allow start of front-end commissioning on the IPS early finish date of Octber29.

Ion Source Group

On Monday, in our group meeting (now scheduled for 11 AM on site in the trailer conference room on site) we discussed our roles and responsibilities according to the SBMS R2A2. These and other safety-related discussions are essential to minimize potential confusion and hence help us to reach our goals safely.

With the help and cooperation from many staff we reached our goal of completing the ion source and LEBT checkout and conditioning, which included a demonstration that we will be able to deliver beam as soon as we get the permission to do so: During Monday and Tuesday, we produced 20 kW plasma, complete with a cesiation at high duty cycle. After reducing the duty below 0.1 % we raised the ion source voltage and measured the load current drawn by the high voltage supply and by the extractor supply. The results clearly showed that during the RF pulse the source supply is loaded with tens of mA of current. The results, however, were inconsistent with our expectations and duplication on the hot-spare stand convinced us that the reactance of the source supply significantly distorts the signal. In addition, some resistance to ground leads to an underestimation of the electron current hitting the extractor. Therefore we halted the effort to estimate the ion beam current from load measurements, for which the system was never designed.

On Tuesday we returned to the high voltage conditioning effort that was suspended after reaching 65 kV for 10 minutes on Saturday, October 12, in rather high humidity. The initial high voltage conditioning effort destroyed many micro relays that are a part of the blue box safety chain. It became quickly clear that the problem would not condition away. After an analysis showed that all broken relay suffered from a degraded coil resistance we installed an oscilloscope to monitor the coil. The coil voltage appeared steady until a quiet, undetected discharge somehow generated an invisible small transient that would reduce the coil resistance. Therefore we started to protect the coil with a small capacitor mounted in parallel, which seems to have fixed the problem. On Thursday, after rearranging some more cables inside the blue box, we reached 70 kV (72 kV on the EPICS screen) for 2.5 hours with a very few sparks in the last hour.

Thursday afternoon we located the extractor ground fault (133 kohm) to be caused by low resistivity water in the cooling loop. On Friday it was found that the check valve prevented the deionized water from flowing. The check valve was removed and the extractor is now fully operational. This is the same or similar check valve that caused the LEBT disintegration during the 5/24 endurance tests in May at LBNL.
The DTI supply arrived Friday afternoon and will be installed on Monday.

In addition to all this efforts, the ion source group and Front end personnel participated in the operator training and made up most missing training segments.

Mechanical Group

The Source/LEBT and the RFQ vacuum systems are fully functioning and quite stable.

Testing is beginning on Rebuncher power supplies as well as low power RFQ tuning.

Magnet Systems

Yesterday the last two HEBT 8D533 dipoles arrived. We will mount one of them on the measurement stand and start measurements. To date, 13 12Q45's have been re-brazed and four have been mapped.

We visited Millhouse in Amherst Va. to look at progress with CCL Quadrupole production. All cores have been machined, a few coils have been wound and coil potting should start today.

Vacuum Systems

Linac HPRF

The RQF transmitter is checked out and ready. A LLRF system for the RFQ is under way and should be ready by the end of the week. Work on the HVCM is under way with check out and pulsing into a resistive load middle of this week. We hope to apply HV to the RFQ klystron by the 4th and have RF into shorted waveguide by the end of the week. Hope to start conditioning the RFQ on the 11th.

Water interconnections on the RFQ RF Transmitter were completed allowing flow through all of the transmitter cooling circuits.

Worked with LANL HPRF Team to bring RFQ Transmitter up to the 'Ready for HV" mode. This included downloading latest PLC software revisions from the transmitter vendor, verifying EPICs communications and logging, checking interlocks and measuring cable/component losses in the directional coupler lines. The DTL1 transmitter was also brought up to the "Ready for HV" mode but water-cooling flows on that system weren't checked.

Linac LLRF

Electrical Systems Group

Held group safety meeting and members of the group received SNS Lockout/tagout safety training as well as SNS "working hot" training. Training was conducted by senior engineer and group member Paul Holik, who was named Accelerator systems Division Safety Officer this week. Paul Holik also held a training class in the above subjects for other members of ASD.

Completed front-end power supplies check out.

Survey and Alignment Group

Job Hazard Analysis (JHA) sheets. Several informal safety meetings were held with engineers and technicians. The revised sheets are being distributed to all group members, discussed in detail, and posted. Jim Maines was assigned the position of the group Electrical Safety Officer. We reviewed the Lock Out/Tag Out procedure for distribution.

We performed some experiments to check the precision of the NA3003 digital level at various distances, and under various lighting conditions. As expected, the use of halogen lights to illuminate the rods resulted in an increase in precision (by a factor of two) over the use of the existing fluorescent lighting in the linac. We also performed some tests to check the repeatability of the collimation constant determination by different methods for "peg tests". A mathematical comparison of the expected precision of different peg tests is also underway. Additionally, the current options for invar leveling rod calibrations were investigated. The only two qualified facilities responding with price and schedule information were Laval University (Quebec) and the Technical University of Munich.

Members of the group met three times with members of the target group. The first was a preliminary design review for the new target cart rails base. Results of visit to Major Tool in Indianapolis were presented. The Core Vessel Support Cylinder (CVSC) is within all print specifications. The largest deviation is 0.004 inches true position. The tolerance was 0.005 inches max. The CVSC is to ship in two weeks. Members of Survey and Alignment held a side meeting with Dave Everett about survey requirements. There are five points that need held on the CVSC. Current plan is to survey in two location pins and drop the CVSC on these pins for location and use fixators for vertical adjustments. There was a discussion as to what will determine the final target location. One side states that the location of the mercury cart due to its lack of adjustments will set the target point and the other is the setting point of the CVSC with determine the target point. The second meeting included representatives from Blaine (the new contractor for target construction) to discuss preliminary scheduling, tolerances, likely DCNs and the proposed local target building control network. Specifically we decided who was to survey the pins in for the CVSC, core vessel cylinder (CVC) and target cart liner. It was decided that Blaine’s folks would shoot the units in and SNS S&A would check the position. Target dates for building the monument system was set for February 2003 while setting the CVC was expected in May 2003. Tom M. requested monitoring of elevations after the monument system is established. The third meeting was to attempt to re-define final coordinates for the center of the target.

Technicians continued layout work for floor monuments in the HEBT area.

Technicians performed layout for the Medium Beta Cryo footprints in the transfer line assembly area of the RATS building. This will allow for an alignment check of the cryomodules before delivery to the site. Four floor monuments and two monuments on columns were installed for later tracker orientation, if any.

The group has been designing an alignment fixture for the magnet measurement group. This fixture will allow the magnet measurement group to position each of the 12Q45 Quadrupole magnets into the magnet measurement

machine in a repeatable, timely, and consistent manner. The fixture is currently at the machine shop being manufactured.

We set 12Q45 magnet in magnet measuring for fiducialization. We are also labeling and punch marking fiducials on same magnets. We updated tracker files with Magnet Designation underscore Serial Number, to avoid confusion until magnets are assigned lattice locations. Several technicians were given a mini training session on optical tooling. This was in conjunction with the alignment of the 12Q45 Quad into the magnet-mapping machine.

The group completed the current phase of Klystron Gallery mapping, and all accessible features were mapped to the plywood RFE wall. Column line points were marked from the end of the currently installed equipment to column line 5.7 (partial on line 5.8).

Permanent labeling of floor and wall monuments in the FEB and Linac was begun. Stainless Steel labels will now replace marker labels. Also begun was the inventory of floor and wall monuments with obstructed lines of sight to determine effects on network adjustments.

The group reviewed the proposed locations for ORNL Surplus Trailers that are to be placed on the SNS Site to support installation and commissioning of accelerator systems. Relocation was suggested for two trailers that blocked lines of sight between global network monuments.

The group received and began review of the latest (preliminary) drawings from BNL pertaining to the Ring, HEBT, RTBT, etc.

Precise elevations were measured at ten cross-sections of the linac floor and compared to previously measured elevations (April 2002) for the same points. The subsidence due to recompression settlement was found to be non-uniform across the tunnel. The portions of the floor adjacent to the walls have subsided more (generally 1-2 mm more) than the center of the tunnel floor.

Cryogenics Group

CHL: The equipment from Linde Boc has been off loaded into the CHL and is awaiting the arrival Monday of the factory assembly crew. Bill Chronis from JLAB will also arrive on Monday to join the team. This team will be assembling the platform structure, installing the panels and turbine cartridges etc.

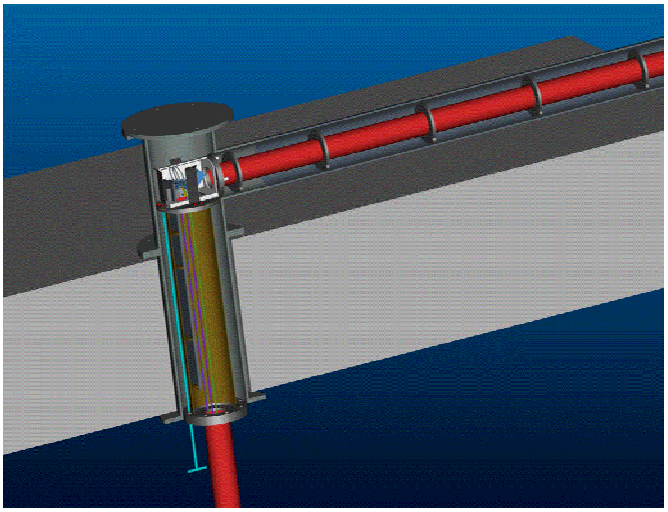
Transfer Lines: The west supply end box is assembled and awaiting shipment to the tunnel. The east supply end box is 50% completed. Return transfer line module HB3/HB2 is completed and awaiting transportation to the tunnel. Return module HB1/MB11 is 95% completed.

Tunnel Installation: Welding of the 3.5" east supply modules is 90% completed.

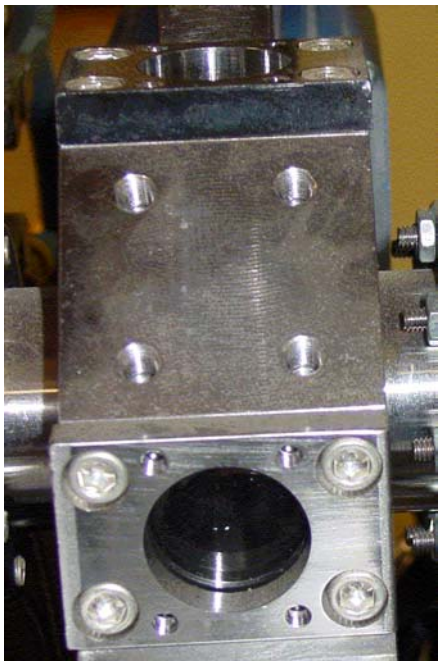
Beam Diagnostics

ORNL beam diagnostics report:

Laser profile monitor design is progressing very well. We installed the 27-foot prototype of the mirror box in the HEBT ceiling on Thursday. Dan Stout and James Kelly led this effort. All went extremely well. Dan also made some HEBT ceiling tunnel vibration measurements. We will analyze the data later on. The mirror box design is shown below. We checked the alignment and the accessibility of bolting the pressurized connection from the HEBT tunnel ceiling (Cyan rod). Kerry Potter is finishing detailing of the SCL tunnel optics box. We expect to send the drawing for prototype manufacturing in 10 days. The physics group is interested in testing the completed prototype before the end of this year.



Jim Pogge has completed the design of the high-speed peak detector. He also set-up the RATS laser room for testing the BNL designed MEBT Laser profile monitor and ORNL Laser. We receive the approval of safety committee to operate the lasers in the RATS building. The mechanical components of the MEBT laser wire system is under studies (the servos, mirrors and the Plano-convex cylindrical lens) to understand the shoulders observed in measured transverse profiles at Berkeley. The preliminary results by Jim Pogge show the servos are slipping and there are smoothness issues. Craig Dawson from BNL helped Jim with MEBT laser electronics. Warren during the installation of the LW discovered charring of the quartz windows due to exposure of the o-ring to laser light. This system is not a baseline device and we can wait until we fully study the alignment issues and details of the mechanics. Jim Pogge will ray trace the MEBT optics.



From the picture above, you can see the exposed o-ring.
Craig Deibele and LANL engineers worked on MEBT BPMs and phase matching the Heliax cables. The BPM electronics that was sent to ORNL from LBNL was non-functional. The preliminary conclusion points to excessive dust and loose connection. Matt Stettler and John Power think that they have found the problem but they need the 2.5 MHz reference from the RF group. We expect to see that on Monday.

Wim Blokland and the Wynn Christensen with help from ORNL technicians installed all five MEBT wire scanners. After biasing the wires, they discovered that all wires require repair due to shorting to ground.

Dave Purcell has all MEBT diagnostic edm screens ready and 100% working, PVs are being published for the physics use and remote access to NADS are available. He has a working bar-code program that is implemented for the MEBT. All TDRs and diagnostic comments can be stored to Oracle via his system. We will use his program for BPM cable installation from now on.

Wim Blokland and Dave Thompson from the controls had a productive meeting with Matt Stettler and Lisa Day on implementation of shared memory. The future revision will provide compatibility with both LANL and ORNL APIs. This will provide LANL with a smooth migration path to IOC core.

Craig Swanson is working on the timing card. He reports the ETC board is now recovering the EL and RTDL. The PCI bus is also communicating with the Altera chip. He is working on enabling the PCI bus to read a set of registers that stores the RTDL frame and data. He expects by the end of next week he will have the RTDL being fully recovered onto the PCI bus.

SNS/ORNL hosted an ICFA Workshop on Diagnostics for High Intensity Hadron Beams. Feedback from the participants was positive and several collaborations may result. John Galambos and Tom Shea are preparing proceedings that will be published on the workshop website and summarized in the next ICFA newsletter.

A meeting of the LLRF Advisory board has been scheduled for next Tuesday. The board will discuss the following: current requirements document, latest development plan, proposed budget, and results of the Berkeley meeting. The group's first report will be drafted next week.

The diagnostics group is helping operations prepare a response to last week's accelerator readiness review. Requirements for beam accounting have been refined and a proposal is in place to add this functionality to the MEBT BCM system. BNL diagnostics and controls groups have already updated the software. A call-down list is being prepared to support operations. In addition, a group meeting was held to review safety and training policies.

LANL beam diagnostics report:

BPM pickups: Fabrication continues on the DTL BPMs. Contact pressure tests on CCL BPM electrode to feedthrough connection all look great. Mapping is now in progress. We received all the SCL BPMs on 17/Oct. Testing will commence soon. The prototype SCL BPM is being shipped to ORNL for testing and characterization.

WS actuators: Both the 3-inch and 6-inch prototype actuators have been cycled 2000 times. They are now being vacuum checked. Positioning accuracy tests will commence soon.

D-plate: Fabrication continues at local machine shops, and assembly continues here at LANL. All Huntington actuators are now on hand, and work is underway to mount the slit heads, the harps, and the wire scanner forks. Beam stop acceptance testing is now scheduled for the week of 28/Oct. Work continues to prepare packing crates for the D-plate shipment to ORNL.

Misc: John Power and Matt Stettler worked at ORNL this week to assist with installation of the MEBT BPM system. Wynn Christensen graciously agreed to extend his stay at ORNL through last weekend and the beginning of this week to continue troubleshooting the MEBT wire scanner actuators. Mike Plum attended the ICFA beam diagnostics workshop at ORNL this week.

BNL beam diagnostics report:

General: Preparations for the DOE review continue. Three group members attended the ORNL Diagnostics workshop, and participated in preparations for MEBT commissioning.

1.5.7.1 BPM: The base-band IFE is still in layout. The 17MHz diplexer has been bread-boarded. It provides good SWR (<1.2:1 DC to >300MHz), however a resonance at 374MHz due to self-resonance of an inductor was observed

and is being corrected. Simulation of Ring beam spectral content continues. Five units of 26cm BPM PUEs have been sent out for brazing. Five additional 26cm PUEs are in assembly in preparation for brazing.

1.5.7.2 IPM: Assembly of Argonne-style electron detectors for testing in RHIC ring (and comparison with CERN style detectors) continues. Detailed design of IPM electromagnets and vacuum chamber is underway. Presentation on the SNS IPM was given at the Diagnostics workshop.

1.5.7.3 BLM: Detailed design of AFE schematic and detector end cap PCB layout continues. We received an estimate from a local vendor of $130 each, (large quantity) for manufacture and installation of the endcap for the new style detector. We began the effort to purchase 10 of the newly designed BLM detectors from LND for testing and eventual installation in the DTL early next year.

1.5.7.4 BCM: A low current calibrator has been constructed. There seems to be a problem with the second channel DAC. As a result, plan for MEBT commissioning is to have one calibrator channel set to 4.998ma, and the second to 4.066ma. A request from ORNL for changes to software to provide difference measurements during MEBT commissioning is under investigation. Parts for the high current calibration driver have been received. A group member traveled to ORNL to assist with BCM commissioning efforts. Efforts are progressing to accommodate an ORNL request for changes to software to provide difference measurements.

1.5.7.5 Tune: Presentation on the incoherent tune measurement was given at the Diagnostics workshop.

1.5.7.6a Carbon Wire Scanner: A group member assisted in chasing electrical shorts in the MEBT wire scanner system. Preliminary conclusion was that these shorts do not originate in the fork/actuator assembly. Refinement of the MEBT scanner carbon wire attachment method continues. Continuing investigation of alternative vacuum chamber designs in response to the LANL request to accommodate the 6" wide LANL fork in the 5"OD beam pipe in HEBT.

1.5.7.6b Laser Wire Scanner: Still waiting for word from ORNL on the status of and requirements for any laser wire testing they might want accomplished at BNL. Time is getting short. Presentation on a fast, low laser power, low cost laser wire for the AGS LTB line was given at the Diagnostics workshop, and was well received by the participants.

1.5.7.8 Video Foil Monitor: Discussions continue with machine physicists and mechanical engineers to implement the third camera in the VPM system, to monitor the electron catcher. Evaluation of the 'throwaway' IR camera option is progressing with assistance from applied physics group.

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