Weekly Report – week of February 28, 2011
Fabrication and Assembly of ERL hardware
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Cryogenics: The installation of the cryogenic transfer lines along with wiring of level and temperature sensors to support the ERL and VTF cryo refrigerator continues. Electricians are bring power to the control panels. A recooler requalification test after shipment to BNL was performed which included a vacuum leak check and pressure test. The vacuum relief cover was mounted to the 14" dewar and materials were ordered for the 28" dewar to allow filling.

Laser: Low power alignment of autocorrelator continues. Still working towards getting the pulse measurement setup: continue to work with C-AD Controls group on control issues for that. Materials were received (broad-band amplifier and band-pass filters).

FPC conditioning: The accelerator safety system review committee items are being addressed. There is discussion on whether the FPC's need to be registered as RGD's prior to testing. Final PASS certification is nearing completion.

Photocathode: Drawings for the modification of the UHV cathode transporter are very close to being finalized. A number of parts for the modification have been ordered. Both transport carts are at BNL and are being evaluated for what parts can be used in the modified version of the cathode transporters. Antimony was deposited on both SS and Molybdenum substrates. Antimony thickness varied significantly over the deposited area. Efforts are underway to establish the cause for non-uniformity.

Gun Cryomodule: The gun cavity / helium vessel assembly was re-tuned at AES to optimum room temperature frequency. Cavity will be assembly into tooling for the string mock-up.

PASS System: The modification that has been implemented to allow operations of the 1MW Klystron and the FPCs in the ERL Block enclosure are being tested. The PASS system for the LBH is being certified. The VTF PASS system will continue to make progress as man-power is available and schedule permits.

Mezzanine: The contract has been awarded for the modifications to the mezzanine and a schedule for the work is being set. The top plate pass through sleeve for the mezzanine is complete and delivery will be scheduled.

Large Grain Gun: The 28" Dewar top plate penetrations and baffles have been modeled for proper orientation and use. Measurements of an existing support frame were taken to see if it will work for the 28" dewar top plate. Preliminary discussion on safety requirements for the operation of the 28" large grain gun have taken place.

5-cell cavity/cryomodule: Analysis of ERL 5-cell cavity data from 2010 cold tests shows that spectrum of the cavity resonant frequency detuning has two dominant lines: at ~16 Hz and ~30 Hz. The 16 Hz line is the largest. Its magnitude was significantly (more than a factor of 2) reduced after 5 K helium gas was turned off. Also, the piezo tuner transfer function indicates that those two lines are not cryomodule mechanical resonances, but external excitations. Hence, they can be damped by using the piezoelectric tuner feedback loop.

We have identified three options for the SPL/BNL3 cavity flange design: a Conflat flange brazed on a niobium beam pipe, a zero-impedance flange, and a NbTi flange with double seal. The first option is used on Cornell ERL injector cavities with port ID up to 103 mm. To use it on SPL/BNL3 cavity, its beam pipe will have to be reduced from 156 mm to ~100 mm as AES is not confident that braze on 140 mm beam pipe can be made reliably. The second flange type originated at KEK and is being developed for SRF cavities at Cornell. The third flange type utilizes an external AlMg gasket for vacuum seal and internal Nb to Nb seal for RF currents.

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ERL injection line: Vacuum envelope is in preparation to final review, correction magnets are under design.

ERL Extraction line: Magnets are being fabricated, beam dump pressure vessel code compliance under evaluation, vacuum/instrumentation layout needs to be reviewed and finalized.

ERL Tech Support Area: The EEBA area continues to move forward.Design drawings and cost estimates have been completed. The BID packages have gone out for the construction of the enclosure and refurbishment of this area.