FETS Meeting UCL E3 and E7 – 08th May 2013

Present: J. Pozimski, A. Letchford, P. Savage, M. Dudman, D. Faircloth, S. Lawrie, S. Alsari, S. Gibson, R. D'Arcy, S. Jolly, J. Back, G. Boorman, A. Bosco, M. Aslaninejad,

Apologies: M. Clarke-Gayther, C. Gabor, C. Plostinar, S. Boogert, A. Kurup, P. Posocco,

Circulation: All

Next meeting date: 05th June 2013 at RAL

Administration

1. Finances – Last year the funding was resource not capital. This year it is reversed with £300,000 capital requested which has so far not been refused.

2. Calendar – Calendars will be amalgamated into one. FETS address book not complete, everyone was asked to add their email address via S. Jolly's instructions.

3. Store / Plant room partitions are complete and pumps / equipment is now securely stored. M. Dudman and A. Letchford will be storeroom key holders. A large area of R8 has now been tidied but still areas need to be addressed.

4. Laser – Spec meeting to be organised by M. Dudman. Laser room will need to be cleaned prior to work starting on laser room.

5. IPAC papers – No papers have been submitted for beam diagnostics i.e. BPM. Papers have been submitted for space charge, MEBT, ION source, RFQ, RF and A. Letchford has submitted a general FETS paper.

6. Poster template – Issue with fonts on preloaded text box. If needed this can be deleted to create own layout. The Cockcroft and Oxford logos should be removed and a general poster template should be made available on the FETS webpage.

7. Collaboration with CERN need to be defined with people asked what they want to collaborate on.

MEBT

Chopper / Dump – No update

Cavities – No update

Integration (P. Savage)

1. P. Savage and S. Lawrie are looking to reduce captive items using vac tight tube design.
2. Option to split yoke or beam pipe in situ. Manufacturer to be consulted on costs.

Design (M. Aslaninejad)

1. Field maps produced by S. Lawrie and A. Letchford. A comparison of old and new maps show they are similar.
2. Cavities can be ordered as they correspond with J. Pozimski's estimates of 5.8Kw.
3. A. Letchford expressed concerns as when he ran a comparison the chopper did not work in the configuration and may not work with the distribution.
4. The beam only just fits the beam pipe with small losses. However any misalignment will result in greater losses so is this a viable lattice?
5. There is a trade-off between beam diagnostics and beam components. In a real linac there would be less diagnostic components.

Magnets (S. Lawrie)

1. S. Lawrie has had a first go at field map. The quad spec is 41.5mm OD, 70mm total length including coil, 3380 A turns per pole and individually powered. There is not much space for coils therefore there should be few turns as possible.
2. Power supply cost is £1405 for base unit with discount for more. Therefore 10 off (including spare) will cost £14 K.
3. There could be increased losses in 10mm OD x 30 metre long cables.
   Quads in close proximity to each other could cause overlapping of fields. A 3mm chamfer has been added to design to compensate for this.
4. Improved homogeneity relative to central field and linearity with applied current. There is no saturation so bore size could possibly be increased to aid MEBT design.
5. Quotes to be obtained with possible delivery by end of 2013.

Beam Diagnostic

Toroid (S. Lawrie / P. Savage)

1. Design is fine and has been vac tested to confirm seals are leak tight.
2. Toroid's downstream of beam dumps may be welded to vessel to gain space. If there is room it will be stand alone.

BPM (S. Jolly)

1. There are two designs from CERN, 76mm and 72mm shortened strip design 39mm OD. Total length is 140mm including bellows.
2. Electronics are based on CERN design, S. Jolly is waiting to check schematics.
3. Performance comparison between strip line and buttons to be done.

DAQ - G. Boorman had to leave before updating the DAQ.

Laser (A. Bosco)

1. A meeting is to be organised to discuss the laser room specification.
2. Tests carried out at RHU have produced results where loss of efficiency dropping peak power by a factor of 3. Average energy and peak power does not drop linearly. The pump modulation was set at 5Htz, 200 Ms period at 55A.

3. Could be an issue with wavelength from pump which may be rectified with introduction of filter.
4. An option may be to run the laser at a high duty cycle and chop it externally to send short pulses.
5. Alessio to investigate using a different diode with an increase in amps.

Laser (S. Gibson)

1. Components delivered except fibre and beam expander. There may be an issue with the order going through Oracle at RAL so may be completed using FETS number and credit card at RHU.
2. Schedule to complete tests at RHU by end August. Test will be conducted at CERN prior to FETS beam line tests. This should be planned to ensure it does not overlap with FETS testing.
3. A question was raised with regards to the agreement when at CERN. Is there a loan agreement or will S. Gibson / A. Bosco always be present?

RFQ (P. Savage)

1. P. Savage has visited NAB and used handling frame to rotate sections and assemble section one.
2. End face machining to be completed before coming to RAL. This will take approximately two weeks. NAB will make a simple jig plate to aid machining.
3. The process will be to skim faces to known oversize, D. Wilsher to check / reassemble the final machine at NAB.
4. The issue of the machine 'indent' still needs to be revisited.

RFQ Input acceptance (S. Jolly)

1. There is poor transmission and emittance growth is seen.
2. There are now hard limits, beam no bigger +- 7mm, no more convergent +- 150mrad.
3. Struggling to fit measured LEBT beam into RFQ therefore need more angle out of LEBT. Changing solenoid three for a larger one maybe a possibility.

RF (S. Alsari)

1. 60W test to be planned with original antenna.
2. New layout for RF waveguide route with no coax, reduced losses and low heat transfer.
3. Quotes received for tee splitter and bellows trim section. It may be possible to only use one bellows assembly in one leg with the other being fixed.

Shielding / Infrastructure (M. Dudman)

1. The store room and plant room have been installed.
2. The latest layout was shown to the group who agreed this is the best option. The CAD model needs to be updated to ensure waveguide can pass through false ceiling and the stand can be modified to fit within the space.
3. Custom waveguide may need to be purchased from MEGA to position waveguide correctly.

4. The model will be used as a reference to make sure compatibility is maintained with NELCO's Shielding design.

Ion Source (D. Faircloth)

There was not enough time to give update on ION source.

LEBT (S. Lawrie and J. Back)

There was not enough time to give update on LEBT.

AOB

No recorder AOB.

Actions:

1. P. Savage / S. Lawrie to consult manufacture about yoke design
2. S. Lawrie to give P. Savage the dimension of the yoke.
3. M. Dudman to organise meeting to discuss laser room specification.
4. A. Bosco to carry out further laser tests and report back at next meeting.
5. M. Dudman to progress CAD model of RE system and liaise with K.; Larkin at NELCO on progression of shield design.