KURRI FFAG MEETING 19/11/2015
Google+ hangout meeting

Attendees:
C Prior, D Kelliher, S Machida, S Sheehy - RAL & Oxford
M Haj Tahar, F Meot, S. Berg- BNL
JB Lagrange - Imperial
Y Mori, Y Ishi, T Uesugi, K. Multani - KURRI
A. Adelmann - PSI

Minutes:

1. Ishi-san
There is a problem with the RFQ. An inspection inside today has shown that the RFQ has been leaking glycol, has eroded the surface, there are features up to 3mm in depth.
KURRI team are thinking of fixing the issue themselves in-house but not sure yet how to do this. It will have to be pulled out and it will take at least a few months to recover it. Not sure of the schedule or plan for recovery at the moment. They will update us with information.

F. Meot suggested using old injectors instead, however the beamline to transfer between old (non-linac) injectors has also been removed already along with septum, so the old injectors cannot be used.

S. Machida prompted discussion on what else could we do using the time while the machine is down?

- Could we look at the linearity of the injection line magnets using a bench test measurement? (To resolve discrepancy in dispersion measurements)
- Could also look at measuring the real fields of the magnets, fringe fields, field clamps etc to make simulations more realistic. This would require removing the vacuum chamber and using a robotic measurement technique. This way we could build a better model of the ring with measurements of the fields to use in simulations.
- Francois has discussed also the idea of taking magnetic measurements in the 20 MeV ring to use as a reference to compare to and understand what is going on in the main ring. (JB did tune measurement in booster (small tune variation before, so they have the field map already from measurements. There was a question over whether it was isolated triplet or a triplet in the machine, as there may be an influence between the two. There is a sharp drop in fringe field so the interference shouldn't be too large, however Francois says previous studies show that require < 200 G in area where cavity is installed.)

2. K. Multani

Presented work on beam loss varying the linac trigger delay and pulse width, and includes a new analysis of the data in Python. He analysed the data using a

model of the RLC circuit for fit parameters. The data, analysis, scripts and his report can be found here:
https://github.com/kvmu/KURRI-workterm/tree/master/width_delay_beam_experiment

3. S. Sheehy

Presented a report from the Beam Dynamics Meets Diagnostics workshop in Florence 2 weeks ago. Discussed a number of potential ideas for new diagnostics for the KURRI machine and for future machines.

The 'horizontal stripline BPM' idea may be difficult to realize in the present configuration because the time of flight is only around 1 ns while the low frequency of revolution (MHz) range is much larger. However Mori-san and Ishi-san discussed the idea of having a slow travelling wave device, which they will think about and come back to us.

S. Berg asked about bunch-by-bunch BPM devices, this is particularly challenging in eRHIC where the bunch spacing is only ~15ns (cf 50 ns revolution time in EMMA).

4. Mori-san: experiment vs simulation tunes

Presented a slide comparing the Kyushu simulation vs experimental data (from KEK) which are within roughly 1% of each other. The simulation includes the patch, with very fine mesh size around the area of the patch. He suggests next stage is to re-model the KURRI FFAG in Tosca including accurate information on the patch. Then compare to experimental results. We hope this way the simulation and experiment will be closer. (A Kyushu student will hopefully do this work soon).

Main differences between 2 machines: the patch, thickness of the top plate of the machine and the material the magnets are built from.

Shinji suggests making plot of tunes as a function of time or momentum rather than horizontal vs vertical tunes.

5. Shinji Machida: simulation plan

Shinji gave an overview of progress on the simulation plan.

From previous benchmarking work, we ran out of time to include OPAL for longitudinal benchmark as Chris R's variable RF package was very new. OPAL people should also track single particle in longitudinal phase space and make a benchmark.

Action: S. Sheehy to meet with A. Adelmann to progress this work

We also need to remake the TOSCA file with finer mesh size. It probably needs to

be down to 1mm mesh size. (Mori-san says there is an issue with EM modeler in TOSCA found by Kyushu people.) One of the Kyushu students is trying to make a fine mesh field map for the KURRI machine.

Malek seems to have solved the longitudinal discrepancy between SCode and ZGOUBI so can move forward on that.

Mori-san asks – do you think we need an impedance calculation for the vacuum chamber of magnetic configuration? The vertical chamber gap is quite small in the KURRI machine. At present intensity not a big problem but may want to estimate the impedance.

Action: Add item to simulation plan, calculation of impedance and effect on high intensity beam (using MAFIA)

Action: We probably need to update and release a new version of the simulation plan

Next meeting: To be arranged by Doodle poll. Could be December 17th but this date is not good for RAL group. Suzie will sort out timings (as daylight savings changes for a few of us) and issue gmail invitations.