KURRI FFAG MEETING 12/2/2014

Google+ hangout meeting

Attendees:

C. Prior
C. Rogers
S. Sheehy
D. Kelliher
S. Machida
Y. Ishi
T. Uesugi
Y. Kuriyama
Y. Mori
J. B Lagrange
J. Pasternak
F. Meot
M. Tahar

Minutes

Slides and files on http://hadron.kek.jp/FFAG/colabo/index.htm

1. Matters arising from last meeting:

   SLS updated on the amplifier procurement which is proceeding as planned. Delivery will be made in two parts, one very soon and the other in mid-March.

2. Simulation and analysis updates:

   a. Update of Geant simulation [Chris Rogers]

      Chris gave a quick verbal update on his monte carlo simulations looking at whether they can reproduce observed effects including the time and energy spread of the beam. Simulations include amplitude dependent time of flight, foil scattering, scattering from the foil holder etc. Another update is forthcoming. He is also working on modeling the bunch monitor pickup to understand the signals being observed.

   b. About 2nd peak in bunch monitor [Shinji Machida]
      - Studied how the second peak observed in some data might be formed and compared 2 models of either initial energy loss or constant energy loss. Seems consistent with the initial energy loss idea as the constant energy loss is so low. He deduced that there may be some interaction with a ~50 micron thick material by part of the beam at injection.
      - [Y.I.] There is a small amount of Al foil between the foil holder and the foil itself which is necessary in the foil production process, so it might be the Al foil.
      - If the beam is small enough, we could avoid this problem by re-matching the vertical direction and making sure the beam avoids the holder.
      - There was also discussion about the effect being tune-dependent, as it is observed when tune is near half integer.

3. Experimental studies/plans:

    a. RF acceleration with local k-index correction [T. Uesugi]
    b. Proposals for March 2014, 3-week experimental visit [Suzie Sheehy]

    [Y.M] Suggests perhaps look into tune method using RF knockout measured at KEK. It has been attempted at KURRI before but the intensity was insufficient to measure sidebands, which is why the perturbator is used now. Since the injector has been updated, could try it again?

    [Y.I.] Notes that the beam size from the linac is (possibly) 2cm so the foil size is really the 'aperture limit' in the machine. Vacuum chamber at injection is 4cm but foil is 2cm. (Will we need to collimate it in the injection line? At extraction the vacuum chamber is narrower, 2cm). Kurri group to present more info on beam size later.

    c. Beam study subjects on KURRI FFAG [Y. Ishi]
    Points/discussion raised:
        - Dispersion matching could possibly be done using fluorescent screen again… it's hard to see the beam profile due to the geometry so needs to be looked at.
        - Dispersion in the ring is about 0.5m everywhere in the ring. Attempts have been made to match the injection line in to the ring but it was very difficult.
        - Already measured the injection efficiency, but also want to increase the injection efficiency to increase the current in future.
        - Beam energy estimate using FFT analysis -> 10.89±0.11 MeV
        - Injection beam properties in transport line (Mao-san's masters thesis). Beam energy by TOF (2 point scintillator and PMT placed 7.5m apart), TOF 10.76±0.13MeV.
        - Measured the momentum spread ±1.3% in one turn, this agrees with David's analysis as well.
        - Beam energy is varying in time by 1.6% within 30μs beam pulse, measured after the injection line. (V axis increase = E decrease). Need to check if this can this be adjusted using the chopper or if it is a beam loading effect.
        - The next RF cavity is ready to install so will be installed after the new COD correction scheme has been optimised.
    d. RF with local k correction [T. Uesugi]
        - If k changes with energy the momentum compaction changes so the synchronous phase varies.
        - Improved accelerated beam current by factor of 2 using simulated k(E) and by improving the injection setup - further improvements expected if you use the measured k(E).
        - This was performed for short bunch 200ns.
    e. Machine time scheduling [All]
        - This needs further discussion at next meeting
        - Experiments in March will run with 20microgram foil

4. Any other business

Action: SLS to circulate doodle poll to confirm next meeting (26th February TBC?)

Action: SLS to create experiment proposal spreadsheet and circulate ASAP.

Action: CRP to send approximate schedule of who is visiting when from RAL