Minutes of the

PyHEADTAIL Development Meeting #02

Attendees:

A. Axford, H. Bartosik, S. Hegglin, G. Iadarola, K. Li, L. Mether, A. Oeftiger, A. Passarelli, G. Rumolo, M. Schenk

Matters arising:

Round table collecting ongoing major activities:

- G. Iadarola: mainly scrubbing, not much time spent for development activities
- A. Oeftiger: three features pushed to development – all branches were pushed after passing the unittests. Now available in the develop branch: longitudinal space charge with support for PyCUDA, longitudinal phase space matching with arbitrary multi-harmonic buckets with iterative adaptation of Hamiltonian (e.g. for intensity effects) and the Bessetti-Erskine implementation for 2D transverse space charge problems.
- S. Hegglin: unittesting completed. All unittests are functional and should now be used for testing before commit to the develop branch. The work for the new phase space generators is ongoing. The idea is to generate a single bunch using a combination of three generators, one for each plane, and matching sections, if desired. Any generator and matching section is represented by a single function. The generator class takes (optionally) a function for any plane and generates a bunch from there. Functions can modularly be added without changing the interface of the generator class. Multi-bunch would be realised by calling the generator class factory method several times and appending the return object to the beam. The activities were interrupted by a new immediate request for adding dispersion support to the particles class. Emittances are currently computed without taking dispersion into account which lead to fuzzy results for LIU-SPS studies on coating for instability mitigation in the SPS. Methods for extracting the Twiss parameters and dispersion from the bunch are now being added. Minor problems still persist and are being worked on.
- H. Bartosik: nothing to report at this point.
- A. Passarelli: The results obtained for the CLIC damping rings with HEADTAIL have been reproduced with PyHEADTAIL in terms of coherent tune shift. The next step will be to check the rise times. The long term goal will be the implementation of radiation damping into PyHEADTAIL. Models exist and can be taken from implementation from Simon White or Mauro Migliorati (long. plane).
- A. Axford: nothing to report

- M. Schenk: no major activities, mainly busy with scrubbing. A meeting with Alexej Grudiev was held yesterday to present the latest results from the studies on the RFQ. RFQ parameters have been identified and communicated to Alexey. More studies for beam dynamics are now envisaged, in particular, further scans to understand the stabilisation thresholds for the RFQ. In addition, the implementation of the RFQ in BimBim and a systematic study for the stability diagram of the RFQ are on the plan.
- G. Rumolo: thanks to Giovanni for the rom booking! Otherwise, nothing particular to report.
- K. Li: studies for LIU-SPS to check instability thresholds in different chambers of the SPS are ongoing but rely on the correct computation of the emittance in presence of dispersion. LHC simulations confirmed results obtained earlier using NHTVS (A. Burov) and DELPHI (N. Mounet). The macroparticle simulations moreover allowed to identify the modes of instability occurring at the different chromaticities. Detailed studies of the effect of the transverse damper at zero chromaticity are now foreseen.

Agenda:

1. **Brief intro to unittests in PyHEADTAIL (S. Hegglin)**
   The motivation for unittests were introduced. An example of a unittest was shown and some details of the implementation in PyHEADTAIL were mentioned. The unittests will be provided with a git hook such that they will be run before a commit to the develop (and master) branch to ensure they are all passed before any commits can be made.

AOB:

Quickly get back to scrubbing!

KL 20/04/2015