Discussion: Non Linear Beam Dynamics Workshop

General comments

Questions to the linear model

Questions to the non linear model

In General:

1.) We have over 50 synchrotron Light sources in the world and all the machines reached their goals, or? These are good news. One exception is ANKA, the goal was to reach 400 mA, but the limit is 180 mA. The reason is the low injection energy.

2.) We need a good strategy for achieving a good lifetime (Annick)

3.) We need a "good model of the machines" in order to predict the behaviour of new concepts, of new light sources.

4.) We need a **"good code"**

4.) Should we make a bench marking of the different codes (MAD, BETA, ELEGANT, RACETRACK, TRACY, etc?) How do we organize it?
Proposal: We need for each code an expert to run the code
We use a machine (DIAMOND, SOLEIL) as a model
Diamond must give us the input lattice of the machine, which a good description of the elements.
Each expert is calculating the linear and non linear behaviour of the Machine
A comparison of the results must be done
A list of measurements has to be proposed
Some special machine shifts have to be made in order to make these measurements

Questions:

Linear model of the machines (working points, chromaticities, momentum compaction factor, etc) : Do we have the right codes? Do we have an agreement between theory and experiment? I would say yes, but I have some concerns about the chromaticities.

For the Linear Model we need the specifications of the magnets:

Bending: field mapping should be done

Quadrupoles: Is a measurement of the higher multipoles with a rotating coil enough? Do we need the longitudinal distribution of the higher multipoles?

Sextupoles: Is a measurement of the higher multipoles with a rotating coil enough? Do we need the longitudinal distribution of the higher multipoles?

Insertion devices: Do we need to have a field mapping too?
Is the flipping coils measurement enough?

Questions:

Non linear behaviour:

Tune variation as a function of the amplitude and energy.

ESRF: There is agreement for tune shifts with momentum except for the offset in vertical chromaticity mentioned before, and for the tune shift with amplitude if the tune shift from the quadrupole fringe fields are included

Soleil: There is a good agreement between model and Experiment

Diamond: there is agreement either in detuning with amplitude or in detuning with momentum if calibration factors for the sextupole are fitted. Not simultaneous agreement yet.

Others: ???????

Question: Do we have the right measurement tools?

Dynamic Aperture:

There is a difference between the model and the experiment

Question: Do we have the right measurement tools?