

BNL Visit and Issues

(July 12-16, 2000)

- 1) Ring Beam Dynamic Physics Model Development and Implementation** (*Mike Blaskiewicz, Alexei Fedotov, Nuria Catalan-Lasheras, Jeff Holmes, Sarah Cousineau*)
 - A) Beam-in Gap Kicker**
 - B) Collimation**
 - C) Boundary and Wall Conditions**
 - D) Diagnostics**

2) UAL Development (*Nicolay Malitsky, Alexei Fedotov, Jeff Holmes*)

A) Unified Accelerator Library – Nicolay Malitsky is architect and maintainer

- a) **Powerful capabilities** – TEAPOT, space charge, fringe fields
- b) **Well benchmarked** – TEAPOT, MARYLIE, SIMPSONS, ORBIT
- c) **Going parallel**
- d) **Excellent set of tools for ring beam dynamics studies.**

B) Needs:

- a) **More beam diagnostics** – tunes, moments, Poincare plots, access to all lattice elements
- b) **Physics models discussed in 1) above**

C) Development Approach – UAL is a library of established computational tools. Development of new tools is to be carried out in other codes. New tools will be implemented only after thorough development and testing.

D) Upgrade ORBIT - Given the above development approach, we have decided to use ORBIT as the site for developing physics models for UAL.

3) Beam-in-Gap Kicker (*Nuria Catalan-Lasheras, Pete Cameron, Sarah Cousineau, Jeff Holmes*)

A) Idea – resonant beam-in-gap cleaning to remove particles to collimators in ~10 turns

B) Use up to 5 stripline kickers to provide small +/- vertical kicks to beam

a) **Vertical kicking in TEM mode**

b) **1 meter length, up to ~7 keV voltage**

c) **Rise time ~5 ns, flattop ~250-300 ns**

d) **Provide kicks ~1 mr**

e) **Locate in straight section**

C) Developing simulation model in ORBIT - Have started by installing simple thin node to provide momentum kick of specified size and direction. Incremental analysis and development is planned. Will also need to develop collimation models in ORBIT. Nuria Catalan-Lasheras is working on this.

- 4) **Boundary and Wall Conditions** (*Mike Blaskiewicz, Alexei Fedotov, Jeff Holmes, Sarah Cousineau, Slava Danilov*)
- A) **Impedance modeling – an open question in UAL or ORBIT**
 - a) **ORBIT has longitudinal impedance model of ESME – applicable at low frequencies, but difficult to scale to high frequency**
 - b) **Transverse impedance a more difficult subject**
 - B) **Space charge boundary conditions** – moments approach for simple wall shapes suggested by Mike Blaskiewicz. This is under study for development in ORBIT.
- 5) **Ring Lattice: Errors and Correction** (*Kip Gardner, Ioannis Papaphilippou, Nick Tsoupas, Dan Abell, Alexei Fedotov, Jeff Holmes*) – a public directory is being established and will be maintained on sun1.sns.bnl.gov with complete ring lattice (MAD) files including error correction families and error files.