

ACCELERATOR SEMINAR

“Tracking and Analysis in the Lens* Paradigm”

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The theory should be centered on the “Tracking Code”. This is for me is an “article-of-faith”. In this talk I will describe the code itself and theory. I will introduce some “new” structures which are necessary in a lens (“s”) centered code; although, 95% of this talk can be deduced from a lucid reading of my published work.

Once such a code is written, the theory should fit it like a glove. Courant-Snyder theory, as it is now taught, is a pale substitute which barely succeed to go into the linear coupled regime, and does so only with smooth Hamiltonians incompatible with the “Tracking Code” and lens-based structure.

My talk on the code will introduce new concepts, such as the mathematical fact that a trackable beam line is not a collection of magnets, and that by freeing oneself from this erroneous concept, the world of infinitely complex topologies is opened to the user of a lens-based code: recirculators, pretzels, dog bones, figure 8, colliders, etc.....

I will explain the so-called “universal Twiss loop” which trivially generalizes Courant-Snyder theory to the full nonlinear spin-orbital maps with or without classical radiation, with or without magnet modulation.

The old theory based on smooth Hamiltonian is still there: it is a limiting case and people can still use it for pencil and paper calculations.

In practice, part of this theoretical program sits inside the code MAD-X and the code BMAD of Cornell. In the near future, I expect the code BMAD, with the help of Dr. David Sagan, to use all of these constructs if demanded by the user.

A fully functioning toy program is already available for the study of the universal Twiss loop.

*The lens paradigm is a technological prejudice that incites us to describe, in our codes and our minds, an accelerator in term of a catalog of lenses – propagators from one plane to another.

Coffee before seminar at 10:45 a.m.

Thursday, December 6, 2012

11:00 a.m.

CEBAF Center, Room F113