



USPAS – *Simulation of Beam and Plasma Systems*

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Computer Lab: **Slice Energy Spread**

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<http://uspas.fnal.gov/programs/2018/odu/courses/beam-plasma-systems.shtml>

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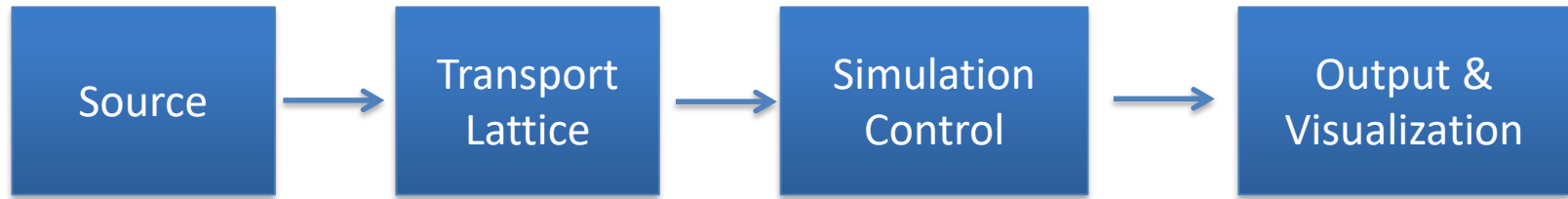
Goals

- Learn how to control the longitudinal phase space of a beam.
- Motivation and background will be provided during the lecture, after lunch



The Elegant Simulation Workflow

Typical work flow for Elegant using sirepo interface



Define beam parameters:

Energy
Energy spread
Twiss
Chirp
Distribution
Offsets
Etc.

OR

Import existing

Construct transport:

Drifts
Quads
Dipoles
Screens
Etc.

OR

Import existing

Setup simulation:

Output control
Higher order
Optimization
Etc.

OR

Import existing

Graphic output:

Phase spaces
Beam Trajectory
Twiss evolution
Etc.

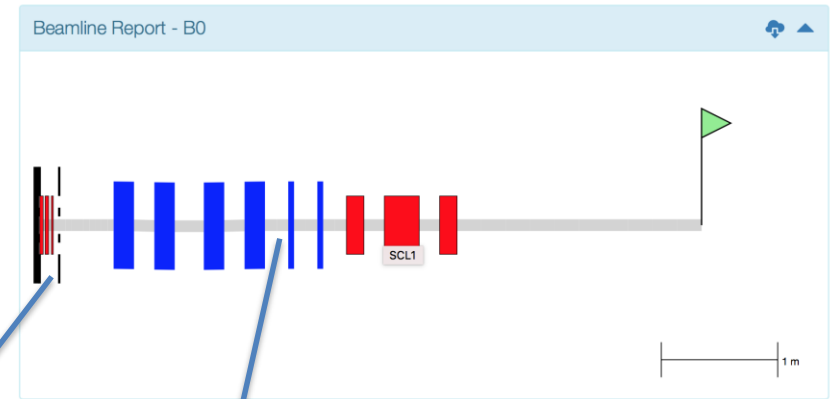
THEN

Conduct experiment,
Publish paper, etc.

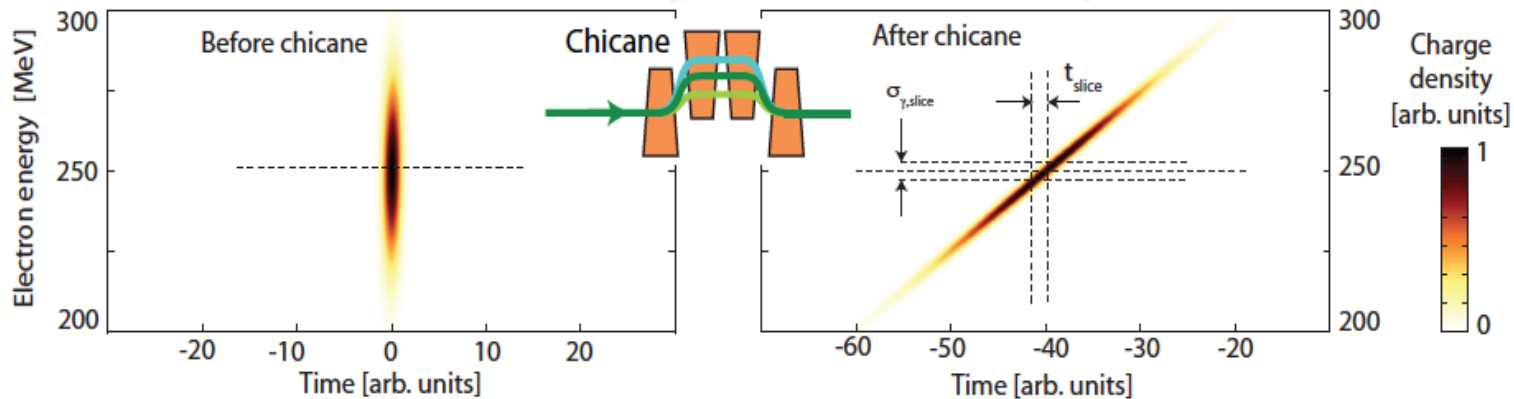


User case: Chicane for LPA-FEL

- LPA source brightness is good for FEL, slice energy spread is not
- Use chicane to *stretch* beam, reduce slice energy spread
- Find balance between reduction in beam current and slice energy spread
- Optimal R_{56} depends on initial beam parameters



Modeled with Sirepo/elegant



Courtesy S. Barber (LBNL)