



USPAS – *Simulation of Beam and Plasma Systems*

Steven M. Lund, Jean-Luc Vay, Remi Lehe, Daniel Winklehner and David L. Bruhwiler

Computer Lab: **Slice Energy Spread**

Instructor: David L. Bruhwiler

Contributors: G. Andonian, UCLA / RadiaBeam Tech

J. van Tilborg, Lawrence Berkeley Lab



U.S. Particle Accelerator School sponsored by **Old Dominion University**

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

January 15-26, 2018 – Hampton, Virginia

This material is based upon work supported by the U.S. Department of Energy, Office of Science, Offices of High Energy Physics and Basic Energy Sciences, under Award Number(s) DE-SC0011237 and DE-SC0011340.



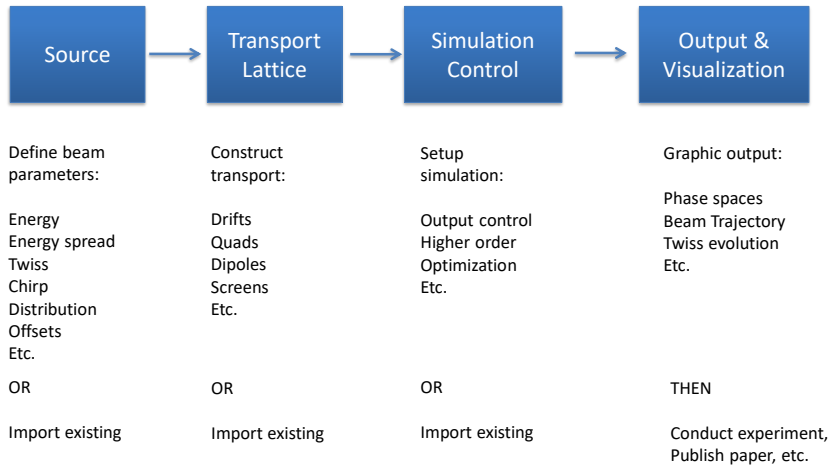
Goals

- 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

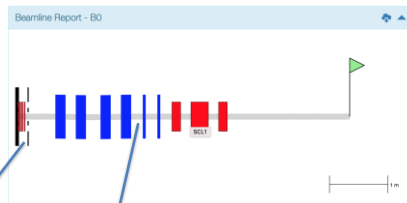


D. Bruhwiler – USPAS – January 2018 – Slice Energy Spread

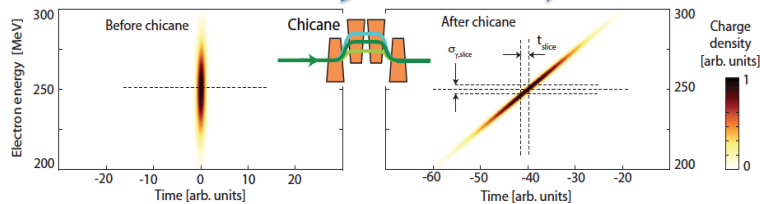
3

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)



D. Bruhwiler – USPAS – January 2018 – Slice Energy Spread

4