Zgoubi Workshop Agenda
26 – 30 August 2019

Monday, 26 August — Introduction to Zgoubi

Talks: F. Méot, D. Abell, K. Hock / V. Ranjbar, D. Kelliher
Tutorial leaders: D. Abell, K. Hock, D. Kelliher
Machines: Los Alamos PSR, AGS, eRHIC, Radial Sector FFA

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 Schedule for Monday
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09:00 – 09:55 Talks Mo1 – Mo3 (all times include questions)
09:55 – 10:10 Coffee Break
10:10 – 10:30 Talk Mo4
10:30 – 11:00 Tutorial TutMo1
11:00 – 12:30 Tutorial TutMo2
12:30 – 13:30 Lunch (on your own)
13:30 – 14:30 Tutorial TutMo2 (cont.)
14:30 – 14:50 Coffee Break
14:50 – 17:30 Tutorial TutMo3

Mo1: *Overview of Zgoubi* — François Méot [20 min]

Mo2: *Los Alamos PSR for Code Benchmarking* — Dan Abell [15 min]

Mo3: *AGS Booster for eRHIC, BNL EIC* — Kiel Hock / Vahid Ranjbar [20 min]

Mo4: *FFA Renaissance* — David Kelliher [20 min]

TutMo1: *Introduction to Zgoubi on JupyterLab* — Dan Abell [15 min]
This tutorial provides a brief introduction to using Zgoubi inside the RadiaSoft JupyterLab.

TutMo2: *Intro to Zgoubi with the Los Alamos PSR* — Dan Abell & Kiel Hock
This tutorial is built around a simple machine: the ten-cell, 797 MeV Los Alamos PSR. The initial exercise illustrates the basic Zgoubi files for input and output, and it demonstrates how to choose an appropriate step size. The following two exercises introduce the standard linear and nonlinear analyses — including tune, chromaticity, and Twiss functions. In the final exercise, we add both spin and acceleration, and simulate the crossing of a spin resonance.

TutMo3: *FFA Tutorial* — David Kelliher
We simulate a 150 MeV, zero-chromaticity radial-sector FFA. This will include synchrocyclotron-like spiraling accelerated orbit, scaling lattice functions. If time allows, include multi-turn injection, and/or RF capture, and/or dynamic aperture computation.

Talks: B. Nash, V. Morozov
Tutorial leaders: F. Lin, B. Nash
Machines: JLEIC

 Schedule for Tuesday

09:00 – 09:40 Talks Tu1 – Tu2 (all times include questions)
09:40 – 10:00 Coffee Break
10:00 – 12:30 Tutorial TutTu1
12:30 – 13:30 Poster Session and Lunch
13:30 – 15:00 Tutorial TutTu1 (cont.)
15:00 – 15:20 Coffee Break
15:20 – 17:30 Tutorial TutTu1 (cont.)

Tu1: *Physics of Electron Rings* — Boaz Nash [20 min]

Tu2: *Polarized Electrons in Designs for JLEIC* — Vasiliy Morozov [20 min]

TutTu1: *ESRF and JLEIC Electron Ring Simulations* — Fanglei Lin & Boaz Nash
This tutorial will include three exercises to study the simulation of synchrotron radiation (SR) and electron spin dynamics in Zgoubi. The first will focus on a single dipole magnet to explore the details of the Monte Carlo method. The second introduces the ESRF lattice and simulates the process of beam equilibration in the presence of SR. And the third exercise will simulate spin dynamics and polarization lifetime in the 12 GeV, figure-8, zero-spin-tune lattice for JLEIC.

Talks: N. Tsoupas
Tutorial leaders: F. Méot, N. Tsoupas
Machines: CBETA ERL

 Schedule for Wednesday

09:00 – 09:20 Talks We1 (all times include questions)
09:20 – 09:40 Coffee break
09:40 – 12:00 Tutorial TutWe1
12:30 – __?__ Excursion to Rocky Mountain National Park (lunch on the bus)

We1: *Field Map Simulations for the CBETA Accelerator*— Nicholaos Tsoupas [20 min]

TutWe1: *CBETA ERL Prototyping* — François Méot & Nicholaos Tsoupas
CBETA recirculates electron bunches to 150 MeV using a superconducting RF linac, FFA return arcs, four-line spreader and combiner sections, and energy recovery. A series of three exercises will introduce the students to the simulation of a multi-pass ERL. These exercises showcase several of Zgoubi's strengths. It is also an opportunity to introduce accurate tracking in magnet field maps. The exercises build on the tutorials of the previous two days.

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Thursday, 29 August — Electrostatic Devices in Zgoubi

Talks: L. Serani, F. Méot, D. Abell
Tutorial Leaders: L. Serani, F. Méot
Machines: Magneto-Electrostatic spectrometer, Wien filter spin rotator, *ExB* Nanoprobe

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 Schedule for Thursday

09:00 – 09:55 Talks Th1 – Th3 (all times include questions)
09:55 – 10:10 Coffee Break
10:10 – 12:30 Tutorial TutTh1
12:30 – 13:30 Lunch (on your own)
13:30 – 15:00 Tutorial TutTh2
15:00 – 15:20 Coffee Break
15:20 – 17:30 Tutorial TutTh3

Th1: *Electrostatic Spectrometers* — Laurent Serani [20 min]

Th2: *ExB Nanoprobe* — François Méot [20 min]

Th3: *Electrostatic Machines for pEDM* — Dan Abell [15 min]

TutTh1: *Magneto- and Electrostatic Mass Separator* — Laurent Serani

TutTh2: *Wien Filter, Fringe Fields* — François Méot & Laurent Serani

TutTh3: *ExB Nanoprobe* — François Méot

Simulate various machines/devices with electrostatic elements: an electrostatic ring, a combined ExB mass separator, a Wien filter spin rotator, and an ExB achromatic final focus system. Simulations for these devices will introduce workshop participants not only to additional element types in Zgoubi, but also to new types of analyses with Zgoubi.

Friday, 30 August — Future Developments for Zgoubi, Interfaces, and User Feedback

Talks: F. Méot, D. Abell, P. Moeller, D. Kelliher

 Schedule for Friday

09:00 – 10:30 Talks Fr1 – Fr4 (all times include questions)
10:30 – 10:50 Coffee Break
10:50 – 11:45 Sirepo / Python Interface Discussion
11:45 – 12:15 Workshop Summary and User Feedback
12:15   Adjourn Workshop

Fr1: *The Future of Zgoubi* — François Méot & Dan Abell [15 min]

Fr2: *Symplectic Tracking in Zgoubi* — Michael Wu [15 min]

Fr3: *The Sirepo interface for Zgoubi* — Paul Moeller [30 min]

Fr4: *PyZgoubi* — David Kelliher [30 min]