Program of BOUT++ Workshop

7:00 Shuttle bus leaves from hotel to LLNL on Sept 14
8:00 Shuttle bus leaves from hotel to LLNL on Sept 15 and 16
8:30 – 9:00 QA
9:00 – 10:30 Morning Session
10:30 – 11:00 Coffee break
11:00 – 12:30 Morning Session
12:30 – 14:00 Lunch
14:00 – 15:30 Afternoon Session
15:30 – 16:00 Coffee break
16:00 – 17:40 Afternoon Session
17:40 Shuttle bus leaves from LLNL to hotel

Returns badges at the end of the 3rd day or when finishing attending the workshop.

**Day 1: Overview and Setting up BOUT++**

7:15 - 9:30 Badging, Setup Wireless Accounts
9:30 - 9:40 Welcome, Don Correll
9:40 - 9:50 Workshop Agenda and Logistics, Xueqiao Xu

Session 1
9:50 – 10:20 Introduction and Overview of BOUT++ Code, Ben Dudson
10:20 – 10:50 Status of BOUT++ Simulations, Xueqiao Xu

10:50 – 11:00 Coffee break

Session 2
11:00 – 11:30 Setting up BOUT++, Chair, Francois Waelbroeck
11:00 – 11:30 Downloading, Compiling, and Running BOUT++, Sean Farley
11:30 – 12:00 A Brief Overview of PETSc Capabilities that can be employed by BOUT++, Hong Zhang
12:00 – 12:30 Overview of the BOUT++ Code Structure, Ben Dudson
12:30 – 14:00 Lunch at the Central Cafeteria

**Day 1: Lab exercises 1: Basic BOUT++ Example Simulations**

Session 3: **Drift Instability or Interchange Mode**
14:00 – 14:30 Hands-on Running Examples, Maxim Umansky
14:30 – 15:30 Lab Exercises

15:30 – 16:00 Coffee break

Session 4: **Post-processing and Analysis Tools**
15:30 – 16:00 Hands-on Running Examples, Maxim Umansky
16:00 – 17:40 Lab Exercises

**Day 2: Solvers**

8:30 – 8:45 Questions/Answers 1, Sean Farley / Maxim Umansky

Session 1: Solvers and Numerical Schemes,
Chair, Lois Curfman McInnes
8:45 – 9:15 Available Solvers in BOUT++ Package, Ben Dudson
9:15 – 9:45 SUNDIALS Solver Packages, Carol Woodward
9:45 – 10:30 Physics Based Preconditioners,
Oakridge National Lab., Luis Chacon

10:30 – 11:00 Coffee break

Session 2: Solvers and Numerical Schemes-continued,
Chair, Lois Curfman McInnes
11:00 – 11:30 BOUT++ Performance Analysis, Praveen Narayanan
11:30 – 12:00 hypre Solver Packages, Rob Falgout
12:00 – 12:30 Discussion 1, Extending BOUT++ Performance: Solvers,
Time Integration, Preconditioning, Numerical Issues,
Scalability
Lois Curfman McInnes

12:30 – 14:00 Lunch at the Central Cafeteria
**Day 2: Lab exercises: ELMs**

Session 3:
14:00 – 14:30 Hands-on Running Examples --- ELMs, Xueqiao Xu
14:30 – 15:30 Lab Exercises

15:30 – 16:00 Coffee break

Session 4: **ELMs-cont.**
16:00 – 16:30 Hands-on Running Examples --- Getting Equilibria into BOUT++ and Running ELM Cases, Ben Dudson
16:30 – 17:30 Lab Exercises

**Day 3 morning: Turbulence, and GYRO-Fluids**

Session 1:
8:30 – 9:00 Overview of Gyro-fluid models Phil Snyder
9:00 – 9:30 Nonlinear FLR phase-mixing effect on Gyro-fluid results (remote), Bill Dorland
9:30 – 10:00 Gyro-fluid Simulations using TRB Code, SS Kim
10:00 – 10:30 Discussion 2, Gyro-fluid Extension of BOUT++ Code

10:30 – 11:00 Coffee break

Session 2: **BOUT++ Applications in Turbulence Simulations**
Chair, Maxim Umansky
11:00 – 11:30 BOUT++ Simulations of Edge Turbulence in the Alcator C-Mod Tokamak, Evan Davis, MIT
11:30 – 12:00 LAPD Simulations, Brett Friedman, UCLA

12:00 – 12:30 Discussion 3, Chair, Tom Rognlien
- How to divide up the work needed to improve BOUT++ to extend its range of applications;
- How to establish a set of tests before commit additions and modifications in repository

12:30 – 13:15 Lunch at the Central Cafeteria

13:15 – 15:00 **NIF Tour & Group Photo 1:00pm to 2:30pm**
Day 3 afternoon: Turbulence in Tokamaks and Summary

Session 3: Discussion 4, Chair, Tom Rognlien
15:00 – 15:15 Presentation on the code and where improvements are needed, Ben Dudson
15:15 – 15:45 Discussion of future work and how tasks will be divided for ELM and RMP simulations
15:45 – 16:00 Coffee Break

Session 4: Linear Machines
16:00 – 16:30 Hands-on Running Examples ---Linear Machines, Brett Friedman
16:00 – 17:30 Lab Exercises

Close

Tutorial Lecturers: Ben Dudson, Sean Farley, Lois Curfman McInnes, Maxim Umansky, Xueqiao Xu, Hong Zhang

Special lecturers: Luis Chacon, Bill Dorland, Rob Falgout, Phil Snyder, Francois Waelbroeck, Carol Woodward

Lab exercises tutors: Justin Angus, Brett Friedman, Ilon Joseph, Tianyang Xia