**Project X Collaboration Meeting: April 12-14, 2011 at Oak Ridge National Laboratory**

The spring 2011 Project X Collaboration Meeting will be held over April 12-14, 2011 at the Spallation Neutron Source facility at Oak Ridge National Laboratory in Oak Ridge, Tennessee. We would like to take advantage of the presence of this meeting at SNS to integrate discussion of SNS experience with operating a MW class superconducting rf H- linac to the extent possible.

**Meeting Goals**

1. Establish the plan for FY12-13 based on the Project X Reference Design and the CD-1 plan submitted to the DOE.
   1. Identify technical issues and alternatives decisions required prior to establishment of the Project X baseline
   2. Discuss/establish work plan for FY12-13
      1. Goals, milestones, assignments
      2. Understand the integration with the ILC and SRF infrastructure programs
      3. Develop strategies for test facilities.
2. Collaboration Council Meeting
   1. Review of Project X status and strategy
   2. Discuss the draft Collaboration Governance Plan
   3. Review current institutional assignments
   4. Discuss establishment of a Technical Advisory Committee
   5. Establish next Collaboration Meeting dates and site

**Background Information**

Since the September meeting the Reference Design has been adopted as the basis for moving forward toward CD-0, and will form the starting point for the alternatives study and the Conceptual Design that must be developed and documented in advance of CD-1. The Reference Design configuration consists of: 1)a 2.5 MeV front end capable of delivering H- at an average current of 1 mA, with arbitrary bunch patterns consistent with a peak current of 6 mA; 2) a 3 GeV CW linac capable of accelerating H- at an average current of 1 mA; 3)beam delivery at 3 GeV to a transverse deflecting cavity capable of supplying beam to three different experimental areas; 4)a 3-8 GeV pulsed linac capable of delivering 26 mA-msec of beam (1.6×1014 protons) every 0.75 seconds; 5)beam delivery at 8 GeV for accumulation in the existing Recycler; 6)improvements to the Recycler and Main Injector necessary to support the accumulation and subsequent acceleration of 1.6×1014 protons protons every 0.75 seconds; 7)extraction from the Main Injector into the NuMI/LBNE beamline. CD-0 for Project X is anticipated in early 2011. A plan for getting to CD-1 has been created and submitted to the Department of Energy.

The Reference Design is accompanied by an initial cost estimate and a revised RD&D plan. The primary technical challenges are:

* Development of a wideband chopper capable of generating arbitrary bunch patterns, with an average current of 1 mA;
* Development of six types of superconducting accelerating structures operating at three different frequencies and achieving gradients of ~15 MV/m, with Q0’s in excess of 1.5×1010 at 2 K;
* Development of a full concept for a 3-8 GeV pulsed linac that can be married to the CW front end;
* Development of multi-turn H- injection schemes, including schemes not reliant on foils;
* Development of concepts for utilization of Project X in support of a muon-based facility.

The Project X Collaboration consists of nine U.S. laboratories, the GDE/ ART, and four Indian Institutes. The existing collaboration MOUs continue to serve as the overall governing documents for the collaboration through CD-2. A governance plan for the Project X Collaboration, including both national and international partners, is under development.

Funding available for Project X activities in FY11 totals $10.1M. This covers activities both at Fermilab and the outside laboratories. Currently anticipated funding in FY12 and FY13 is $17.4M and $19.1M respectively. These amounts do not include superconducting rf development which is supported independently.

The April 2011 Collaboration Meeting will provide an opportunity to discuss Reference Design and its accompanying technical issues and alternatives for implementation. The primary goal of the meeting will be to resolve technical issues and get an initial look at planning for proceeding from CD-0 to CD-1.

The following documentation will be available for the meeting:

Reference Design Report

RD&D Plan

CD-1 Plan

Draft Collaboration Governance Plan

**Organization**

* Opening plenary session devoted to SNS experience, and Project X status and strategy.
* Individual working group meetings co-organized by Fermilab and outside leads
  + Targeted technical discussions on specific aspects of the Reference Design, and possible alternative implementations;
  + Establish goals and work assignments for the period through CD-1;
  + Develop a provision funding plan for FY2012-13;
* Collaboration Council meeting
  + Request that each participating laboratory provide a representative with authority to speak for their institution in the Collaboration Council meeting.
  + Primary discussion will be on collaboration governance;
  + Secondary discussion on institutional assignments
* Working group summaries on Thursday morning.

End meeting by noon on April 14 to allow people to catch afternoon planes home.

**Provisional Agenda**

Tuesday, April 12

Registration 08:00-08:30

Plenary Session 09:00-10:30

Welcome to ORNL/SNS TBD

SNS Operational Experience TBD

Project X News, Strategy, Meeting Goals S. Holmes

Coffee Break 10:30-11:00

Plenary Session 11:00-12:00

Project X Reference Design Overview S. Nagaitsev

Project X CD-1 Plan Overview TBD

Lunch 12:00-13:00

Working Groups Session 1 13:00-15:00

Collaboration Council meeting 13:00-15:00

Coffee Break 15:00-15:30

Working Groups Session 2 15:30-17:30

Adjourn 17:30

Wednesday, April 13

Working Groups Session 3 8:30-10:00

Coffee Break 10:00-10:30

Working Groups Session 4 10:30-12:00

Lunch 12:00-13:00

Working Groups Session 5 13:00-15:00

Coffee Break 15:00-15:30

Working Groups Session 6 15:30-17:30

Adjourn 17:30

Thursday, April 14

Working Group Reports 08:30-10:00

Coffee Break 10:00-10:30

Working Group Reports 10:30-12:00

Adjourn 12:00

**Working Groups**

Charge to the working groups:

* + Detailed discussion of Reference Design, including specifically targeted technical issues and questions;
  + Discuss possible alternative implementations and define technical options that require decisions;
  + Integrate relevant SNS experience into discussions as appropriate;
  + Establish goals and work assignments for the period through CD-1;
  + Develop strategies for test facilities, as appropriate;
  + Identify any issues related to the above that need resolution

The plan is to run only two working groups in parallel at any given time. This will allow people to have access to multiple working groups. We have extended the meeting by one day relative to prior meetings, thereby increasing the time available for working groups by more than a factor of two. This should allow more discussion time in the WGs.

Program Committee

A program committee has been established to set up the detailed program. Program Committee members are:

Sergei Nagaitsev/Fermilab

Jim Kerby/Fermilab

John Galambos/ORNL

Working Groups/Topics for Discussion

A preliminary list of Working Groups and topics for technical discussion has been developed. The Program Committee will use this as a starting point in their construction of the program. It is anticipated that not all topics listed will actually be discussed at the meeting.

WG1: Front End

* + Ion source, RFQ (162.5 MHz)
  + chopping scheme, beam dynamics
  + Kicker and driver
  + Scraping, absorber/ space requirements
  + diagnostics

WG2. Cryogenics, Cavities and Cryomodules

* Cavity designs
* Gradient, what is the acceptable gradient spread, HOM requirements
* Strawman cryomodule segmentation
* Collimation
* Cryogenic requirements (heat load, temperature, ...)

WG3. RF (cw and pulsed)

* LLRF
* CW: klystrons, IOTs, solid state (325, 650)
* Long pulse (1.3 GHz) – up to 50 ms, 10% duty cycle

WG4. Injection

* Concentrate on a long pulse (26 ms) injection
  + Lower MI energy (6 GeV?)
  + Laser stripping, alternative foil configs
  + Space requirements
  + Ring RF

WG5. Instrumentation, controls, protection systems

* protection requirements beam instrumentation requirements for position, beam arrival time (w.r.t. RF), profiles (transverse + longitudinal)
* beam loss - space requirements and impact on cryomodule design
* collimation

Collaboration Council

* Collaboration governance plan
* Institutional assignments
* FY12-13 plan