

**Controls Telecon meeting notes: meeting with BDS Area Group
10:00 AM CDT 4/13/2006**

Roll-call

ANL

John Carwardine, Claude Saunders, Frank Lenkszus

FNAL

Vince Pavlicek, Sharon Lackey, Margaret Votava, Patty McBride, Brian Chase, Sharon Lackey, Paul Joireman

SLAC

Bob Downy, Janice Nelson, Ray Larsen

KEK

Shinichiro Michizono

RHUL

Graham Blaire

Representing BDS:

Andre Seryei (SLAC), Depa Angal-Kalinin (Daresbury)

Planned list of topics for discussion

Review device spread sheet

Review geographical layout

Controls needs for special equipment

RF System

Machine Detector interface

Claude's device Spread sheet

Are all magnets individually controlled or in chains?

Quads, sextuples, octupoles are individual controlled bending magnets are chained. The number of chains and number of dipoles per chain are not yet determined. That info should be available soon. The magnet counts in the spread sheet are close enough to use for an estimate.

How many bend Ms are chained. How many chains of bends

BDS Group is still working on it. Info should be available at end of week.

Magnet counts are close enough to use for estimate

All magnets except bending magnets will have magnet movers. Each mover provides 4 degrees of freedom – X, Y, and two rotation axes. The motors will be stepping motors with LVDT position readbacks. The movers will be used in a slow feedback loop. It is not decided what if any redundancy will be provided for movers. The motor control

subsystems will include limit switches, power on/off, status indicators, etc. There will only be global control of movers. No local control will be provided.

The crab cavities will also have movers.

Cryo Interface

The final doublets will be cryo. Could be SC octupoles about 500 meters from the IR. Temperatures and pressures along the cryo line will be monitored. The cryo systems will be separate subsystems. The crab cavities close to the IR will require cryo. Andre's web site has info on which magnets are cryo.

The beam abort kickers are strip line kickers. They are switched on to direct beam towards the tune-up dump.

The bend magnets may require field monitoring.

Instrumentation

All bpms are cavity type because of the required resolution. Some have larger apertures. The design is not know yet. The data rates are the same as for the linac,

There are strip line BPMs near the crab cavities that have fast links to FONT feedback. There will be phase reference cavities for the bpms. There will be one per final focus. Steve Smith is the person to ask about the phase reference.

There will be beam size monitors

The laser wires are complete subsystems. Graham is the source for controls. Dedicated bpms with 0.1 micron resolution near the IR may be required for the laser wires. Graham is the source for controls.

Loss Monitors

How many --every 20 meters??

Vacuum controls

Talk to John Noonan

Special instrumentation on collimators - adjustable jaws, 1 degree of freedom for each jaw with 2 jaws per collimator- this is a whole separate subsystem

DEPA – instrumentation on collimators - position

Instrumentation on beam dumps – discuss with the beam dump group. The instrumentation on the beam dump must be rad hard. There will be 2 photon dumps and 6 electron dumps

Beam Current monitors

How many? Minimum of 2 per dump

Bunch length monitor

Talk to Marc Ross

Two additional laser wires: one for energy spread and one for divergence

Mike Woods and Ken Moffeit are points of contact

Are there other devices?

Muon spoilers: talk to Lou Keller

Muon walls - PS for magnet

Geographic Layout

Shafts – not finally decided

Several configurations being considered:

1. Full length service tunnel – not likely
2. Short tunnel at beginning of BDS to kickers and one near collider hall
3. No service tunnels
4. No tunnels but several shafts with buildings on surface
5. Short service tunnel in beginning of BDS and alcoves every 50 meters with no shafts

Number 5, short service tunnel plus alcoves is most likely choice. Alcoves every 50 meters, is the most likely choice (based on a maximum bpm cable length of 25m). Size of alcoves is TBD.

Linac service tunnel will likely be extended as far as the abort kickers - 400 – 500 meters from end of linac. Kicker PS has to be close to kickers for fast rise time.

Lasers will be in service area 1 for electron and one for positron side. The lasers will be in service tunnels.

Question from BDS Group – how much space will controls need?

Base-line – cost what's in spread sheet.

How do we handle additional magnets for 1 TeV? Install ½ the magnets for 500 GeV

MPS

Kickers and Dumps – anything else??

Thermocouples on anything that might scrape the beam.

Thermocouples on magnets for cooling
Thermocouples on the chambers (ring for sure)

FONT feedback at IP

How are fast vacuum interlocks handled? Should be part of vacuum system

RF systems

Crab cavities low power couple 100 watts 3.9 GHz for crab cavity
Monitor HOMs – 5 couplers – need to be monitored

2 stations one per crab cavity, 1 km apart
2 crab cavities per RF station The RF stations are 1 km apart

Crab cavity
Phase stability - < 0.07 degrees for 20 mrad, 0.7 degrees for 2 mrad crossing angle

Andres web site and BCD has info on crab cavities

Brian wants to pulse the crab cavities instead of CW to swamp out HOM

Phase stability is the differential between the the 2 cavities.

Discussion on the Machine Detector Interface was postponed.