

g2p/GEp Beam Transport Meeting Minutes

Attendees: E. Folts, K. Allada, D. Williams, T. Michalski, A. Gavalya, P. Kjeldsen, Eric Forman, J.P. Chen, Y. Roblin, O. Garza, J. Musson, B. Bevins, P. Degtiarenko, K. Mahoney, M. Ivanco

The following is a summary of issues discussed during the g2p/GEp Beam Transport Meeting:

- No helicity lock is required on the Slow Raster.
- BPM Discussion
 - Current lock was brought up as a question – Brian says that they should be able to do this.
 - John Musson presentation:
 - ½ micron steps on the test setup
 - Transmission line – truly simulates the beam (versus a standing wave)
 - Uses a 3 port network analyzer – 1 input, measure x+,x- or y+,y-
 - Stripline BPM is down a factor of two in voltage sensitivity
 - Desire x+,x- and y+,y- to post process
 - Presented SNR vs resolution plot
 - 1 kHz helicity for Qweak drives the data rate
 - For 50 nA, -100dBm (plus 60 dBm SNR), therefore, need -160 to -170 dBm
 - Initial look shows we need 20 dBm additional SNR for 50 nA w/ 100 micron resolution (what Physics needs)
 - SEE electronics have a 8-9 dB noise figure at room temperature. Will need to use the “new electronics”.
 - Discussed cooling the receivers to improve. Further discussion decided this was not a viable solution and won't be pursued.
 - 100 μm • 200 nA $|_{B=50\text{Hz}}$ at 290K
 - 400 μm • 50 nA $|_{B=50\text{Hz}}$ at 290K
 - JP stated we should settle on 5.5” M15 BPM – further discussion found that we need to make sure the beam is centered in the can, between the antennas, when existing FZ2 magnet. Research since the meeting show that this is the case. Therefore, **we will use 5.5” M15 antenna style BPMs.**
 - Ed desires electronics by August. Omar stated the end of September is when they will commit to delivery.
 - JP wants/needs(?) event by event data, tied to helicity
 - John Musson will perform additional analysis/calculations to define what can be achieved for BPM/electronics performance with respect to Physics needs. Where are the requirements satisfied?
 - Need to make sure that helicity signal is distributed to Hall A
 - Look at using the log algorithm.
 - 3 dB gain in image rejection.
 - There are 2 BPMs in front of the Moeller which will also require the new electronics.
- BCM – statement made by John that it has a “whopping” signal and therefore is not an issue. Will need to upgrade BCM electronics as well. Concern about time and effort to update.
- Get Arun Saha involved from Hall A.
- Harp – need to determine what the wire size should be (bigger wire?) – Omar to determine what is needed.
- SW needs prototype electronics earlier than the end of September! Also need to determine the look and feel.
- JP committed to a 2 cm raster, if need be, to accommodate threading the beam through the articulating arm.

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STATUS:

OPTICS:

- No status update

MAGNETS:

- No status update

BEAM TRANSPORT:

- No status update

RAD CON:

- No status update.

SOFTWARE:

- No status update

VACUUM:

- No status update

INSTALLATION:

- No status update

ALIGNMENT:

- No status update

EES – I&C:

- No status update

EES – OPS:

- No status update

EES – SSG:

- No status update

TARGET/DUMP DESIGN ACTIVITIES:

- No status update

PHYSICS

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- No status update

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Action Items:

Action Item #	Date Added	Action Item	Responsible Individual	Due Date	Date Closed
11	9/28/10	Define the settings for chicane magnet current monitoring.	Y. Roblin	10/19/10	
12	9/28/10	Define if instrumentation is required for the low current dump. If so, what should be monitored?	TBD	TRACK to close	
16	10/5/10	Understand why there is a hole in the center of the rastered beam that comes from the faster raster/slow raster combination. Stated to be a waveform generator issue. Clarify this. If not HW, then probably SW?	C. Cuevas B. Gunning	TBD	
21	11/9/10	BPM performance table – M15, M20, electronics	O. Garza/D. Williams	TBD	12/6/10
23	11/16/10	Verify polarity switch for FZ magnets. We have one spare in house if needed.	R. Lauzé	12/30/10	
24	11/23/10	Get FZ magnets from Physics Storage	T. Michalski	1/15/11	
25	11/23/10	Sort out power supplies for FZ magnets. Appears there is still some confusion.	T. Michalski / J.P. Chen	12/30/10	12/6/10
26	12/6/10	Need to make sure that helicity signal is distributed to Hall A	D. Williams	TBD	
27	12/6/10	Determine wire size for harps.	D. Williams/O. Garza	TBD	
28	12/6/10	Get Arun Saha involved in BCM electronics and monitoring.	D. Williams/J. Musson	TBD	
29	12/6/10	Set up a topic specific meeting on BPM w/ new electronics – for SW	T. Michalski	TBD	
30	12/6/10	Update analysis/calculations on BPM and new electronics to insure we can meet the requirements.	J. Musson/D. Williams	TBD	

Design Decisions:

Date	Decision Item
8/31/10	The transport line exiting the FZ2 will have no vacuum connection to the target chamber. A beryllium window will terminate that line.
8/31/10	M20 BPM's were decided to be used on the transport line exiting the FZ2.
9/14/10	The Target will only be set at 80° and 90°, not 70°, per Al Gavalya.
9/14/10	The gap between the beam tube end and the target window was discussed. It should be minimized – consider 1 cm as a

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	maximum gap. Re-opened during 9/21/10 meeting – look at using helium bag. Will use helium bag – issue closed.
9/30/10	The requirement for BPM accuracy is 0.1mm – per discussion at BPM requirements meeting and subsequent analysis/e-mail from K. Allada.
12/6/10	Use 5.5” M15 antenna style BPMs in articulating arm!
12/6/10	JP committed to a 2 cm raster, if need be, to accommodate threading the beam through the articulating arm.