

CBETA FFAG Magnets and girders  
Meeting notes, 10/18/2017  
Prepared by: R. Michnoff

Personnel Present: Diane Hatton, Steve Peggs, Stephen Brooks, Steve Trabocchi, George Mahler, Scott Berg, Joe Tuozzolo, Dejan Trbojevic, Nick Tsoupas, Rob Michnoff, Karl Smolenski, Yulin Li

#### FFAG Girder to Girder interconnections

- Karl and Yulin presented the plan for the FFAG girder to girder interconnections (see separate presentation).
- Every girder to girder connection will include a sliding joint with bellows assembly. Note that the presentation shows that a few interconnections in the straight section do not include sliding joints. During the meeting we decided that every girder to girder connection WILL include a sliding joint with bellows.
- Each sliding joint with bellows assembly will be welded to the beam pipe on one end and a rotatable flange will be provided on the other end.
- Specific bolting technique needs to be determined. Inserting bolts after the Halbach magnets are installed will likely not be possible. One option is to insert the bolts prior to installing the magnet in the girder.
- Need to confirm that the impedance bump within the sliding joint will be acceptable for future high current beam operations.
- Naming convention for the girders needs to be defined.

#### Permanent Magnet Block material

- It was agreed that CBETA project funding will be used to pay for a few days to a couple of weeks of NSLS II technician work for Helmholtz coil measurements of a handful of permanent magnet blocks, which will include all in the first delivery for the BDH magnet. These first blocks are expected to be received in early December 2017. Testing these first blocks quickly is critical to satisfying the December 2017 milestone of completing the first production magnet.

#### Status of corrector magnet procurement

- Statement of work was modified to include first articles
- Drawing checking still is in process; was expected to be complete by end of last week, now expected to be complete today
- The previous date to place this order with a vendor was 10/31/2017. This will likely be late by a few weeks.

#### Status of girder plate drawings and procurement

- BNL will deliver the Halbach magnet models to Yulin to include in the vacuum chamber models.
- Vacuum chamber designs will be provided by Cornell. Yulin indicated that about one month is required to complete this work, so figure by the end of

November 2017. BNL needs this information before proceeding with each girder plate design.

Notes from last week:

- 27 girders total are required, with 17 unique plate designs
- The goal is to complete all of the girder plate designs by December 31, 2017.
- We discussed that it might be worthwhile to procure the girder plates in two batches, depending on when drawings become available.
- Girder plate procurement will likely need to be done through BNL central shops. Costs for this work need to be clearly understood before the work begins. Options for cost-effective fabrication should be explored.

Girder delivery

- Although last week Karl indicated that the order for delivery of girder plates to Cornell is not important, the desired installation order is now to proceed clockwise around the ring.

Notes from last week:

- Karl explained that CHESS equipment will be stored on the south side of the CBETA installation area until July 2018. This is expected to prevent being able to reconfigure the shielding wall until the equipment is moved. The impact of this delay on the CBETA installation schedule needs to be clearly understood. The original expectation was to move the shielding blocks immediately after completing the fractional arc test in April 2017 to allow the girder installation to begin.
- Cable trays will be installed at Cornell after the girder stands are delivered

Girder stands

- The girder stand delivery to Cornell is planned to begin April 2018 and complete by September 1, 2018.

Notes from last week:

- The girder stand drawings will be completed after the girder plate drawings are complete, since the girder plate designs will likely impact the stand designs.
- There is a concern that the preferred Rexroth assembly vendor has been late with previous work. We must therefore plan carefully to avoid delays. The stands need to be delivered to Cornell in advance of the girder plates.

#### Fractional arc test

- The delivery of the fractional arc test beam pipe is still expected to be shipped to BNL from Cornell about 11/15/2017
- BDH magnet design is complete and drawings have been delivered to BNL central shops for fabrication
- Fractional arc test girder design is complete and drawings have been delivered to BNL central shops for fabrication. Steve Trabocchi briefly reviewed this drawing today.

#### Magnet testing

- The disassembly/reassembly test has begun but is not yet complete.

##### Notes from last week:

- The preproduction magnets will be tuned and surveyed using the production procedure that is under development. The short survey arm provided by the C-A survey group will be used as part of this procedure. This work will help us more accurately determine the time required to perform the measure/tune/measure/survey procedure for each magnet.

#### Septum Magnets (in splitter 4, quantity 4 required)

- No discussion this week.

##### Notes from last week:

- A design sketch has been prepared by Nick Tsoupas, but engineering design details have not yet begun. This needs to start soon to allow the splitter beam pipe design to be completed and to ensure that the magnets will be available for final splitter installation in late 2018.