

FFAG magnet and girder meeting

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Sent: Wednesday, September 13, 2017 2:31 PM

To: Peggs, Stephen G; Trbojevic, Dejan; Mahler, George J; Trabocchi, Steven; Brooks, Stephen; Berg, J Scott; Tuozzolo, Joseph E; Roser, Thomas; Tsoupas, Nicholas; Karl Smolenski [karl.smolenski@cornell.edu]; Georg Heinz Hoffstaetter [Georg.Hoffstaetter@cornell.edu]; Wanderer, Peter

Cc: Minty, Michiko; Williams, Khianne

Attachments: CBETA-FFAG-Dipole-Inducta~1.pptx (586 KB)

Here are a few notes from today's meeting:

Personnel present: Joe Tuozzolo, Dejan Trbojevic, George Mahler, Steve Trabocchi, Stephen Brooks, Steve Peggs (via zoom), Scott Berg, Nick Tsoupas, Peter Wanderer, Thomas Roser

- BDH half magnet aluminum housing fabrication will begin right away. The mid-point for the inside dimension will be used. This is expected to be sufficient for this magnet.
- Steve Trabocchi is working on drawings for the BDH magnet and the mounting plate design for the first arc girder. He expects to complete these next week to be presented at the 9/20 review.
- A QF magnet will be used for the disassembly/reassembly test to check the repeatability of the magnet tuning. The preproduction QD reassembly repeatability is not expected to be perfect due to the method used to hold the repelling halves together. This design has been enhanced for the QD production magnet assemblies.
- A discussion took place regarding the magnet measurement setup, including scheduling needs.
 - Assuming that the time required to measure, tune, re-measure, and survey the magnetic center is 1/2 day per magnet, about 6 months will be required for all 220 production magnets. In order to satisfy the required schedule, faster testing would be desirable.
 - Peter W. stated that he would like to have another person trained to perform the measurements in order to provide the support required.
 - Setting up an additional magnetic field measurement system was discussed, but Peter W. indicated some concern about the feasibility - that is, parts availability and engineering/technician availability to design and build the system. Peter W. did indicate that extended working days or working weekends to perform the measurements is a possibility.
 - Stephen Brooks described the inconsistencies that occur when multiple measurements are taken. This needs to be better understood and resolved.
 - George suggested that we purchase 2 survey arms to ensure that CBETA has dedicated availability.
 - The magnet center survey is hoped to be able to be performed without the need for a dedicated survey group person. This will significantly help the flow of progress.
- Joe T. asked if we should consider combining the dipole and quadrupole coils on the FFAG corrector magnets into 1 single coil to save cost. Stephen Brooks indicated that it's important to maintain the future enhancement capability to add quadrupole correction. Therefore, the decision was made to keep the design as is.
- A discussion took place regarding the FFAG corrector power supply requirements. Nick had previously expressed a concern that if set point changes are required at a 10 Hz rate, then a 2V margin in the power supplies would be required.
 - Attached is a presentation prepared by Nick on the topic.
 - The need for fast set point changes was discussed. The FFAG corrector magnets were not designed to be capable of providing fast ≥ 10 Hz corrections that might be caused by vibrations due to pumps, etc. Therefore, fast set point changes are likely not required. Magnet response to set point changes faster than about 1 second can not be guaranteed.
- A somewhat aside discussion included concerns about floor vibration due to pumps, etc and the effect this may have on beam motion. This is an issue that has been discussed in the past and needs to be addressed by Cornell.
- The FFAG magnet and girder review is scheduled for next Wed, 9/20 9am-10am. Since there is a lot to discuss, we will likely extend this to at least 1.5 hours.

- In order to keep the project on schedule, we need to work toward completing the FFAG magnet and girder full assemblies by the end of September 2018. Working backwards assuming 1 week to complete each girder assembly (that is, mounting all components on each plate - beam pipe, magnets, terminal blocks, water hoses, etc.) 6 months are

required. So the first production girder assembly (first one after the fractional arc test girder, which will use vendor supplied production magnets) needs to be completed in March 2018.

These notes and other details are available on the Cornell Wiki at:

<https://wiki.classe.cornell.edu/CBETA/CBETA-FFAG-Magnets-and-Girders>

Please let me know if you're not able to access this page.

Please also let me know if any changes or additions to these notes are needed.

Thanks,
Rob