

Notes on the MTA whitepaper



D. Bowring, Y. Torun, K. Yonehara

MAP 2014 Winter Meeting

December 6, 2014



We wrote a white paper for the GARD panel about the MTA program.

Link to white paper

https:

//indico.fnal.gov/getFile.py/access?contribId=25&sessionId=7&resId=0&materialId=4&confId=8959

- ▶ Submitted to GARD panel on October 17, 2014.
- ▶ Lots of attention to language here. This document might be a good reference for people writing about the MTA.

Section 1.1: Recent Accomplishments

- ▶ 201 MHz cavity & vessel commissioned to design gradient in 3 days w/ no sparks!
- ▶ All-Seasons & gridded window pillboxes confirms our basic understanding of breakdown in B -fields.
- ▶ Modular cavity built and ready to go.
- ▶ HPRF cavity demonstrates viability of cooling channel designs.

Other material in Section 1

- ▶ Facility description
- ▶ Participation (29 students since 2006, 10 postdocs, training the next generation, partnership between FNAL, universities, other labs)

Section 2.1: MICE Cavity Testing

- ▶ Overview of MTA role in MICE
- ▶ Did we mention the SCTS commissioned in 3 days w/ no sparks?
- ▶ Present plan: commissioning, Be window runs, test in external B -field, validate couplers, beam test.

Section 2.2: Vacuum RF program

Open questions:

- ▶ What is a realistic design gradient for cooling channels?
- ▶ How does the conditioning sequence affect performance in B -fields?
- ▶ How does breakdown depend on materials, surface treatments?
- ▶ What is the RF lifetime of Cu? Be?

Planned vacuum RF work:

1. Characterization @ high power w/ Cu plates.
2. Same w/ Be plates
3. Surface lifetime studies

Section 2.3: HPRF program

- ▶ Physics overview, simulation tools
- ▶ Introduction to dielectric loaded cavity
- ▶ Proposed experimental program overview:
 1. Low-power dielectric measurements
 2. High-power tests w/o beam, with and w/o B -field to qualify dielectric inserts, get baseline behavior
 3. Repeat #2 above, but with beam. Study beam/plasma/dielectric interaction. Dope gas, study plasma loading.
- ▶ Some discussion of applications

Section 3: Resources

- ▶ 10 FTEs, mostly based at Fermilab
- ▶ Most hardware required for next 2-3 years is already at Fermilab – M&S requirements are modest.
- ▶ \$1M/year in FY16 and FY17 requested to finish our program successfully.

(Plus concluding material.)