

More Cutouts in B1pF Yoke for Structure Elements for Intermediate Testing

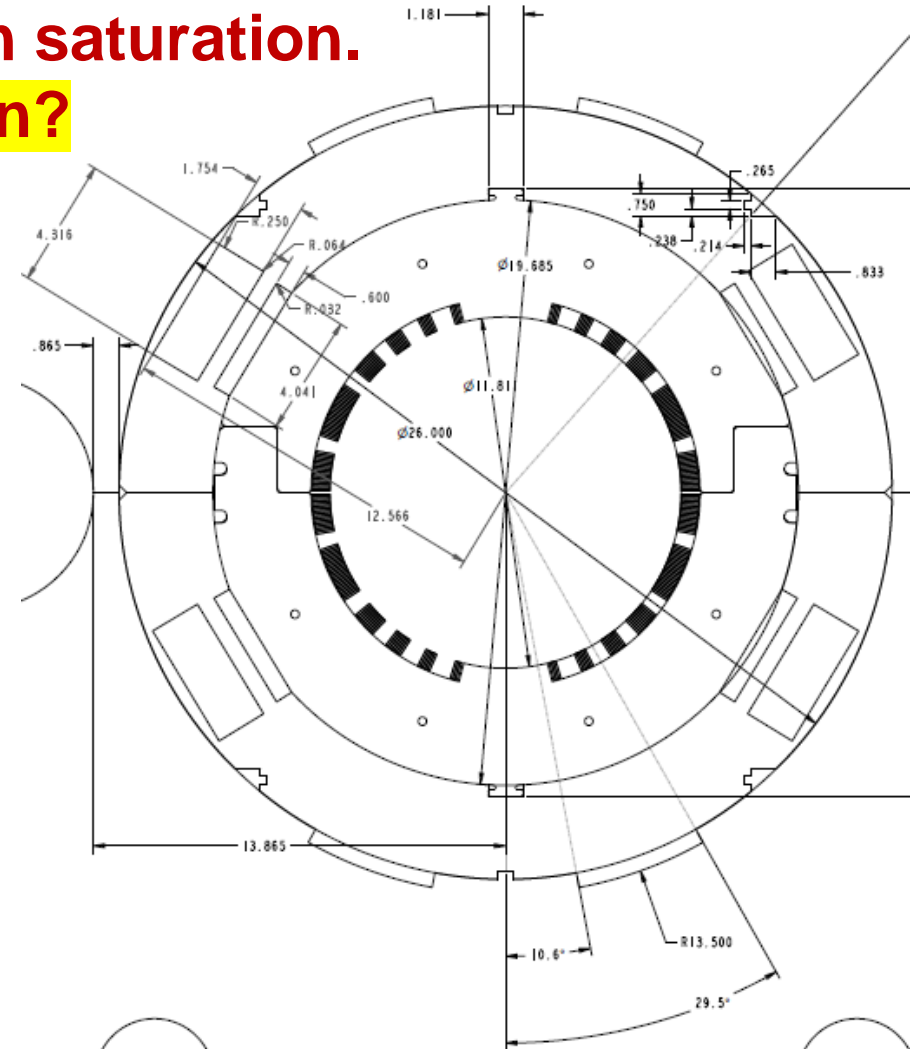
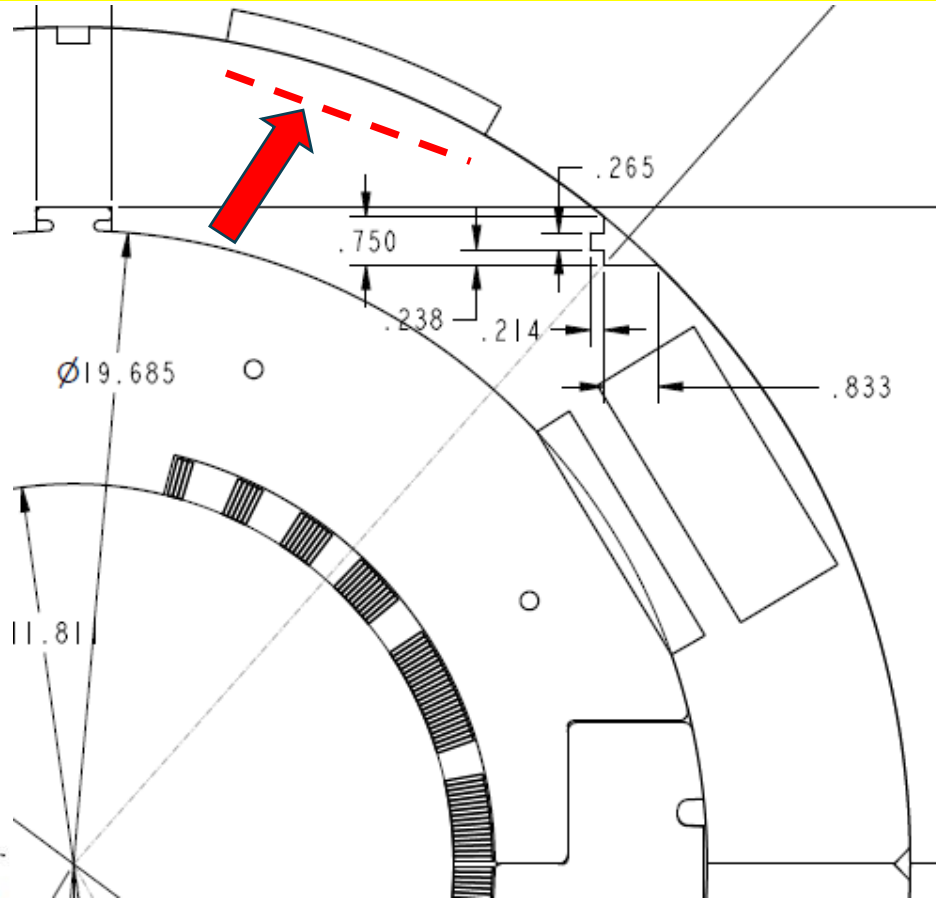
Ramesh Gupta
March 7, 2023



@BrookhavenLab

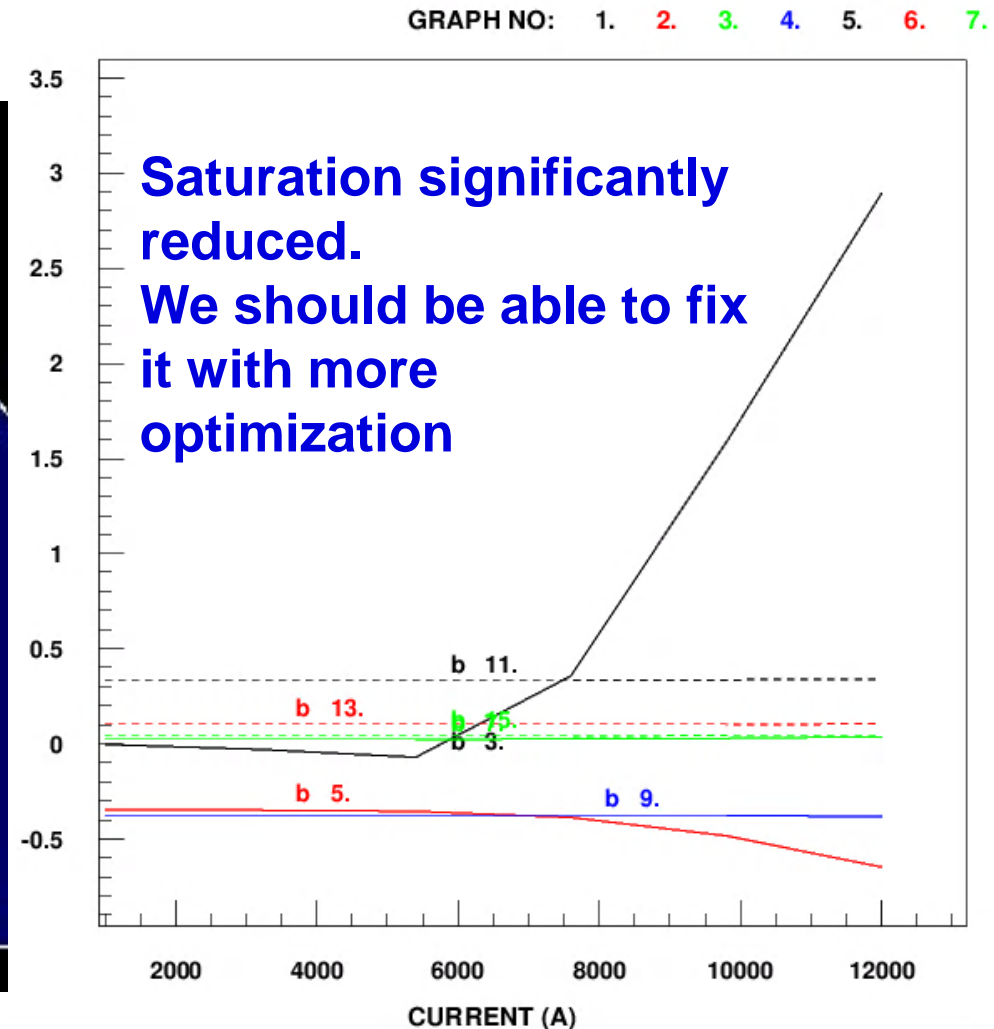
Approach/Issues/Updates on B1pF Yoke

- Magnet will go in 27" Dewar. Use $\frac{1}{2}$ " space available since inner yoke od is 26".
- Must have a cutout in the outer yoke (update: $\frac{1}{2}$ " in inner also).
- This, as such, would have a large impact on iron saturation.
- Challenge: Find an acceptable magnetic solution?

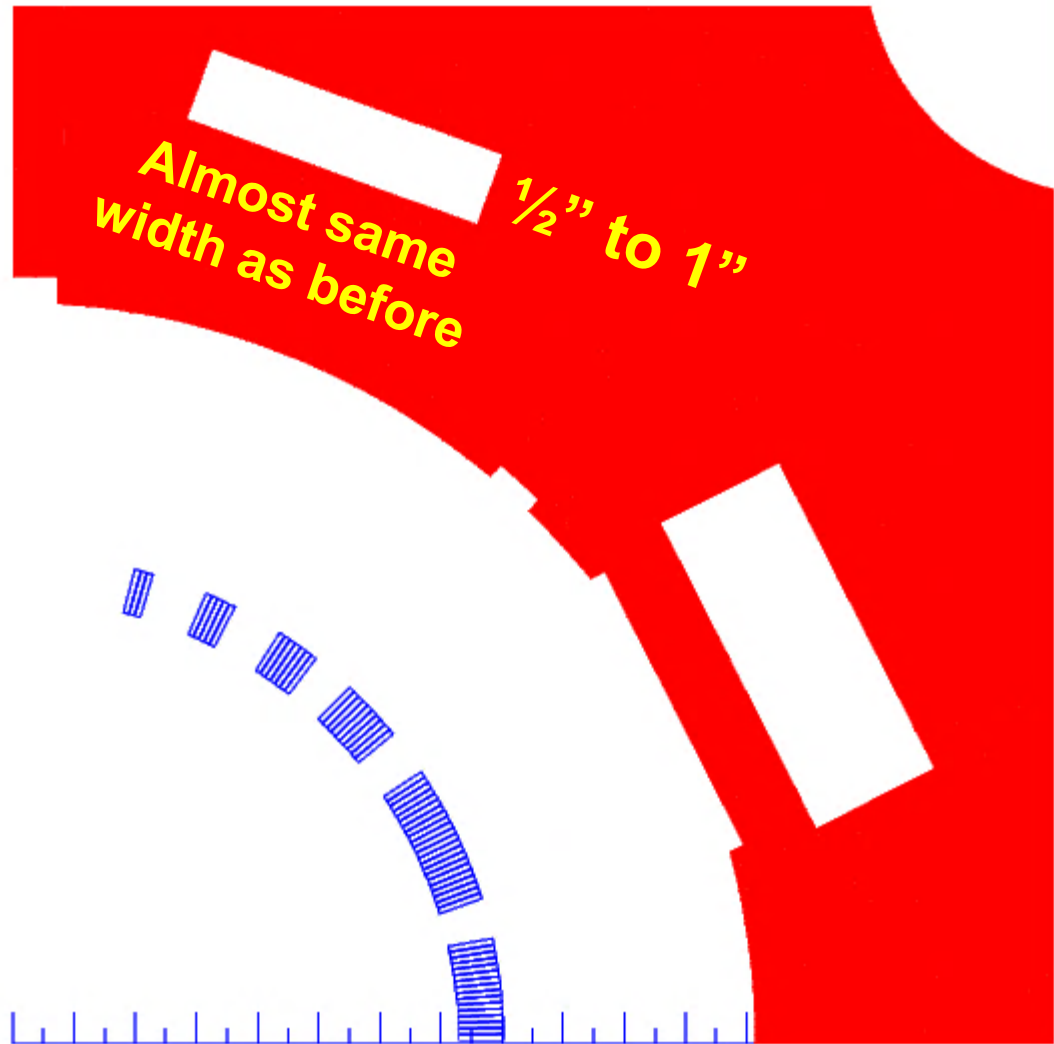


Presented Last Time (Feb 28, 2023)

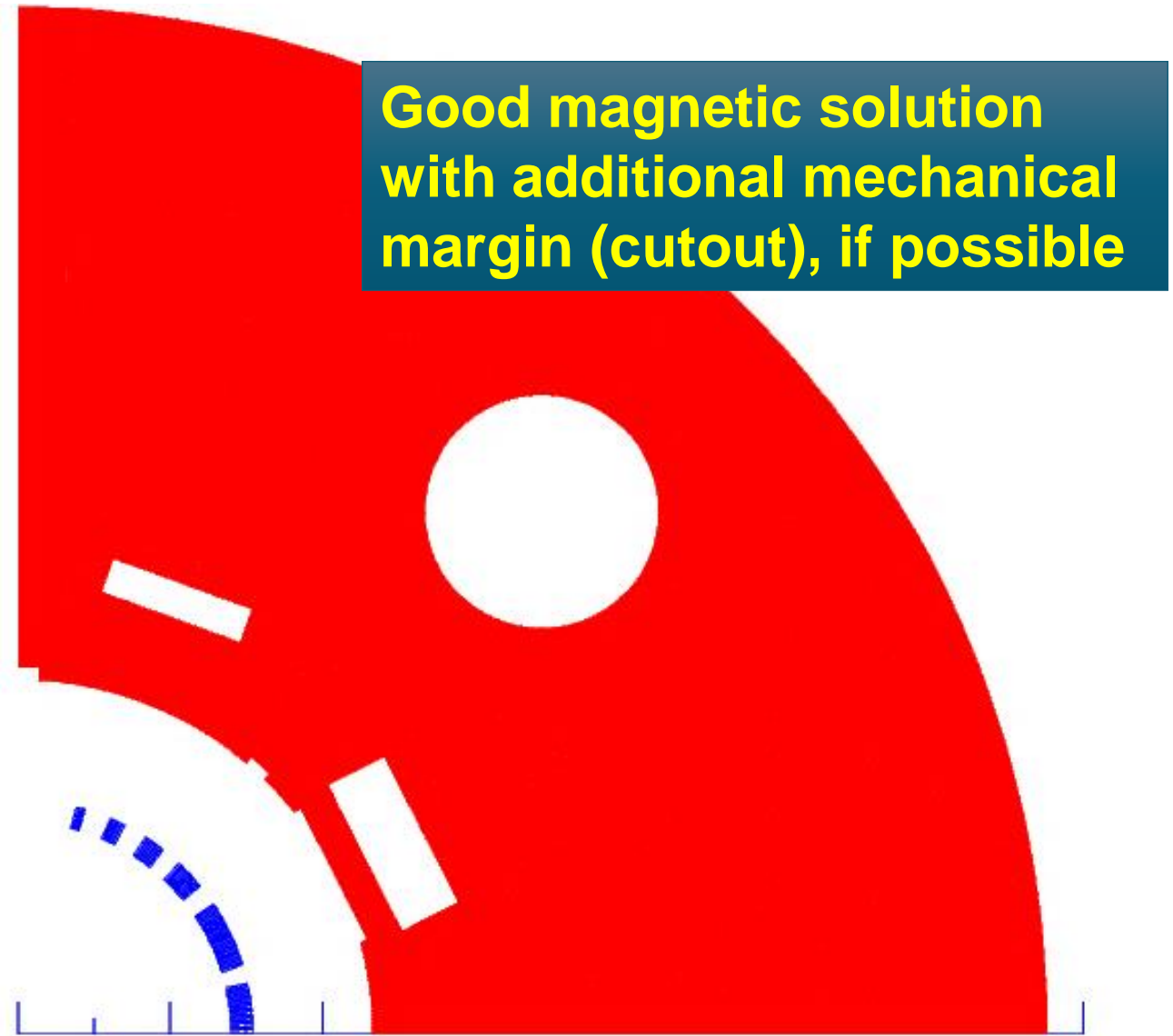
- Can we bring cutout brought closer to vertical plane ?
- Can 1/2" width be increased to 1"?



Search for a Solution to Provide Good Mechanical Solution

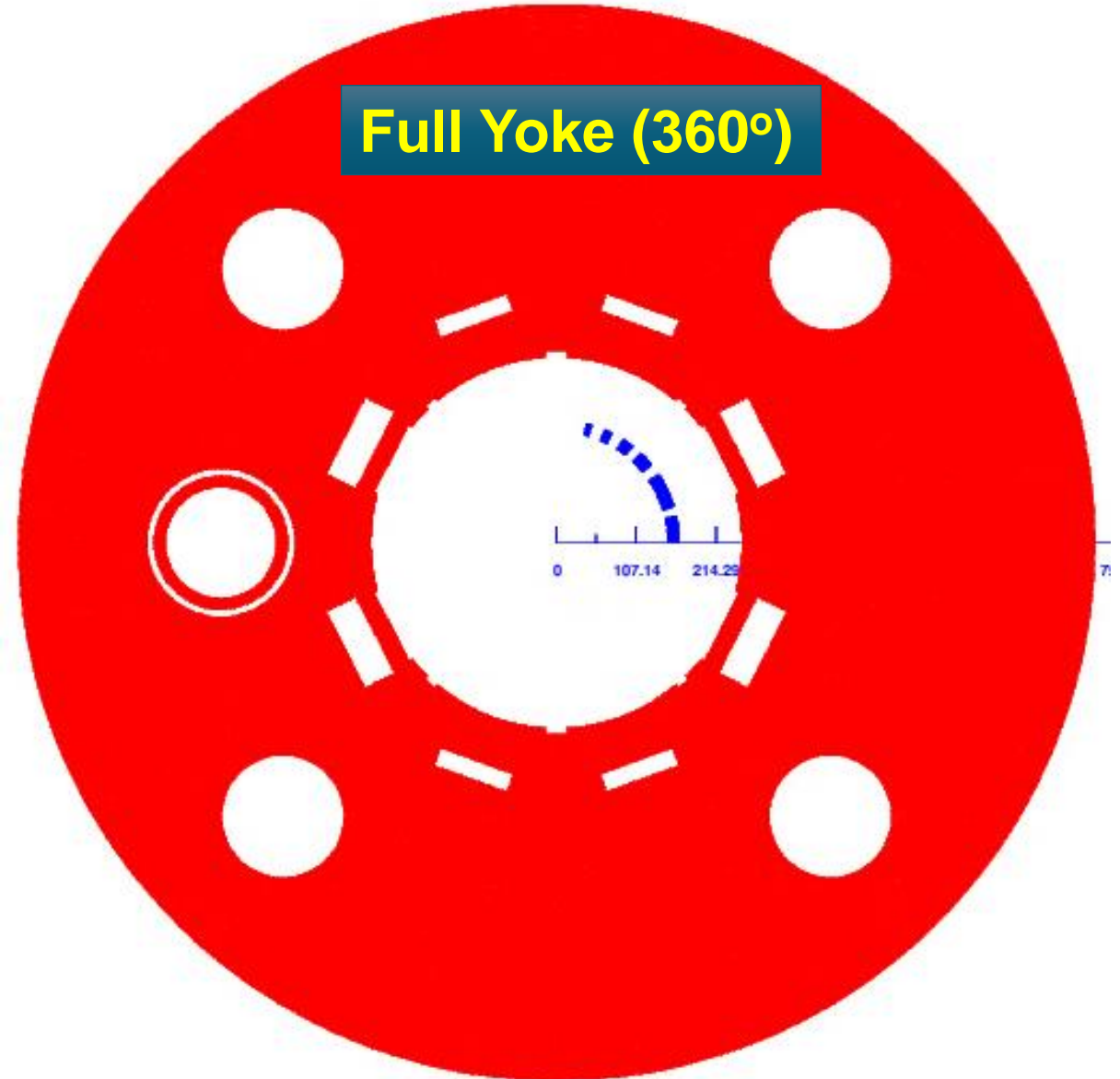
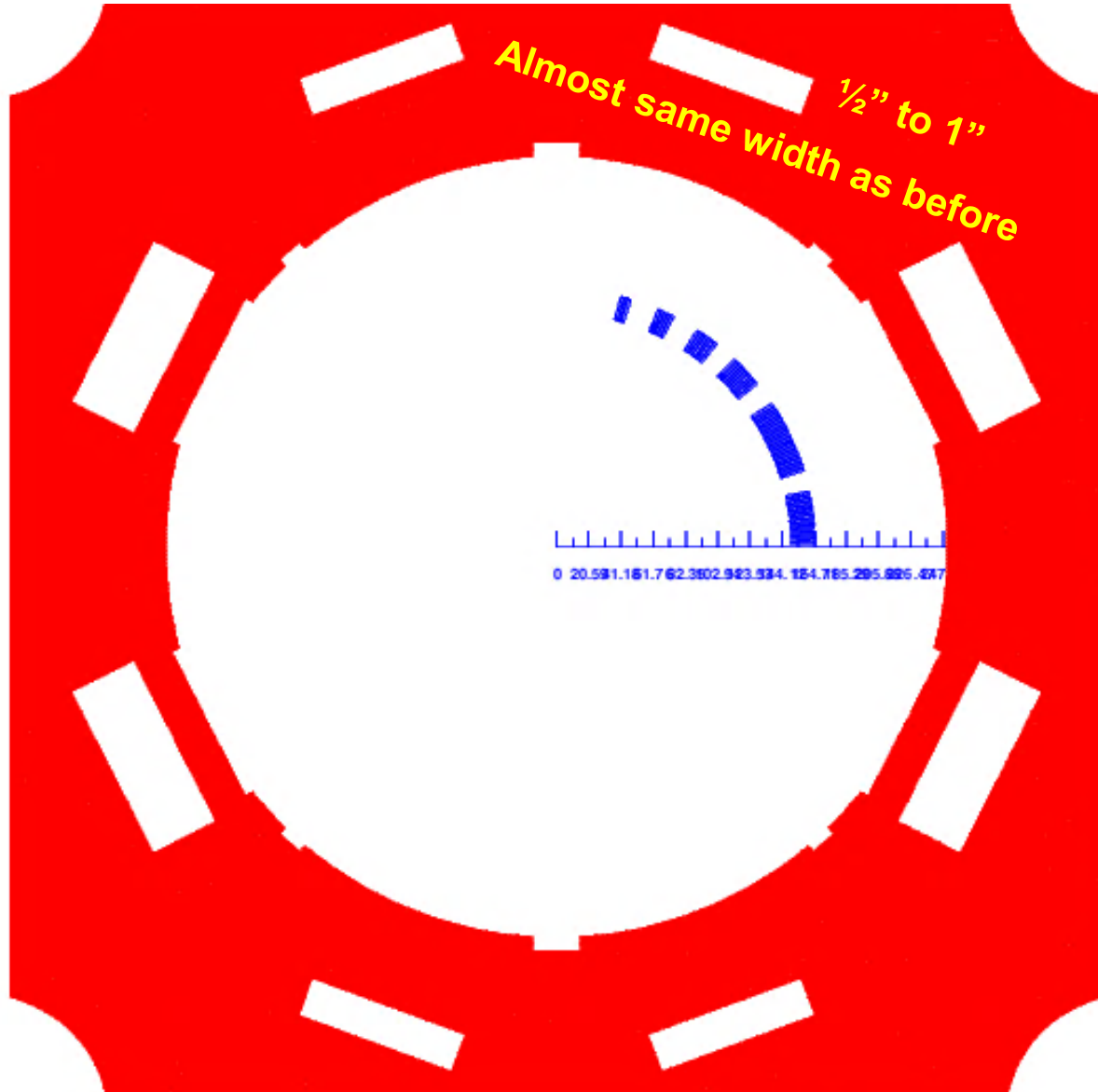


0 20.59 41.18 61.76 82.35 102.94 123.53 144.12 164.71 185.29 195.88 216.47 237.06 257.65 278.24 298.83 319.42 350

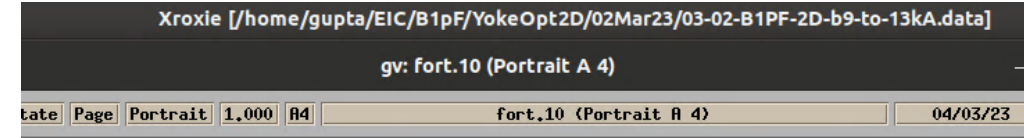
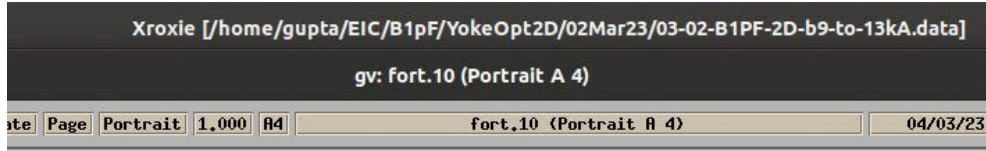


0 107.14 214.29 321.43 428.57 535.71 642.86 750

Search for a Solution to Provide Good Mechanical Solution



A solution found to satisfy the requirements

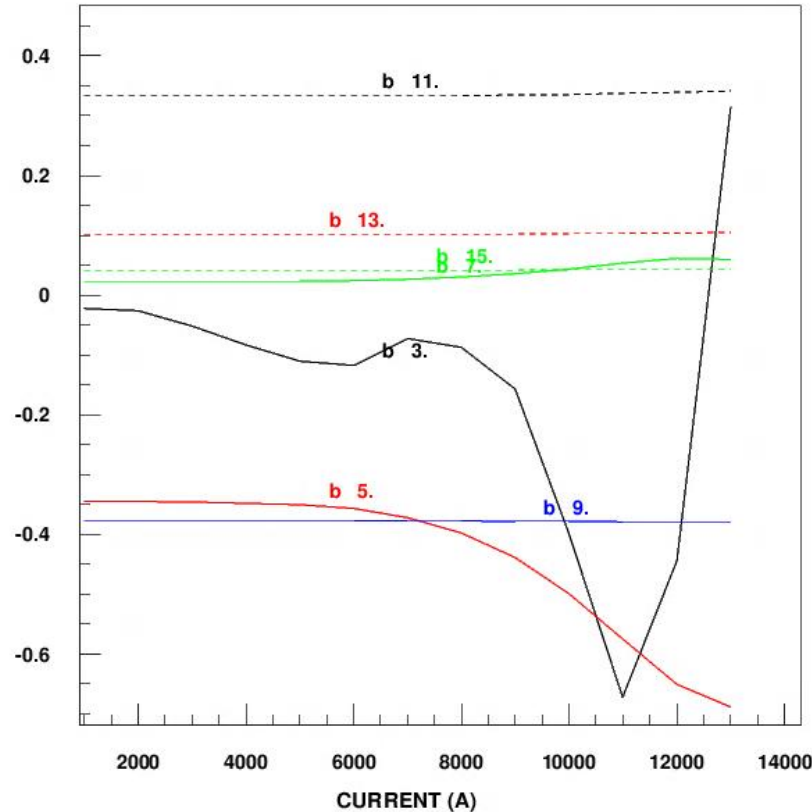


All harmonics <1 units till 13 kA (design ~12 kA)

B1pF Yoke inner yoke od 26

23/03/04 06:09

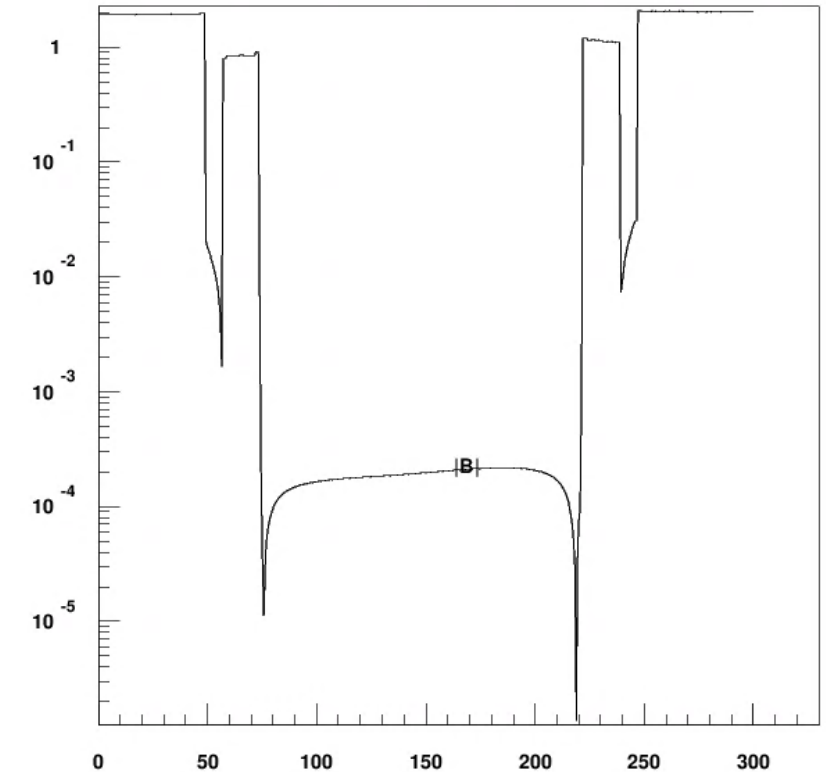
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B1pF Yoke inner yoke od 26

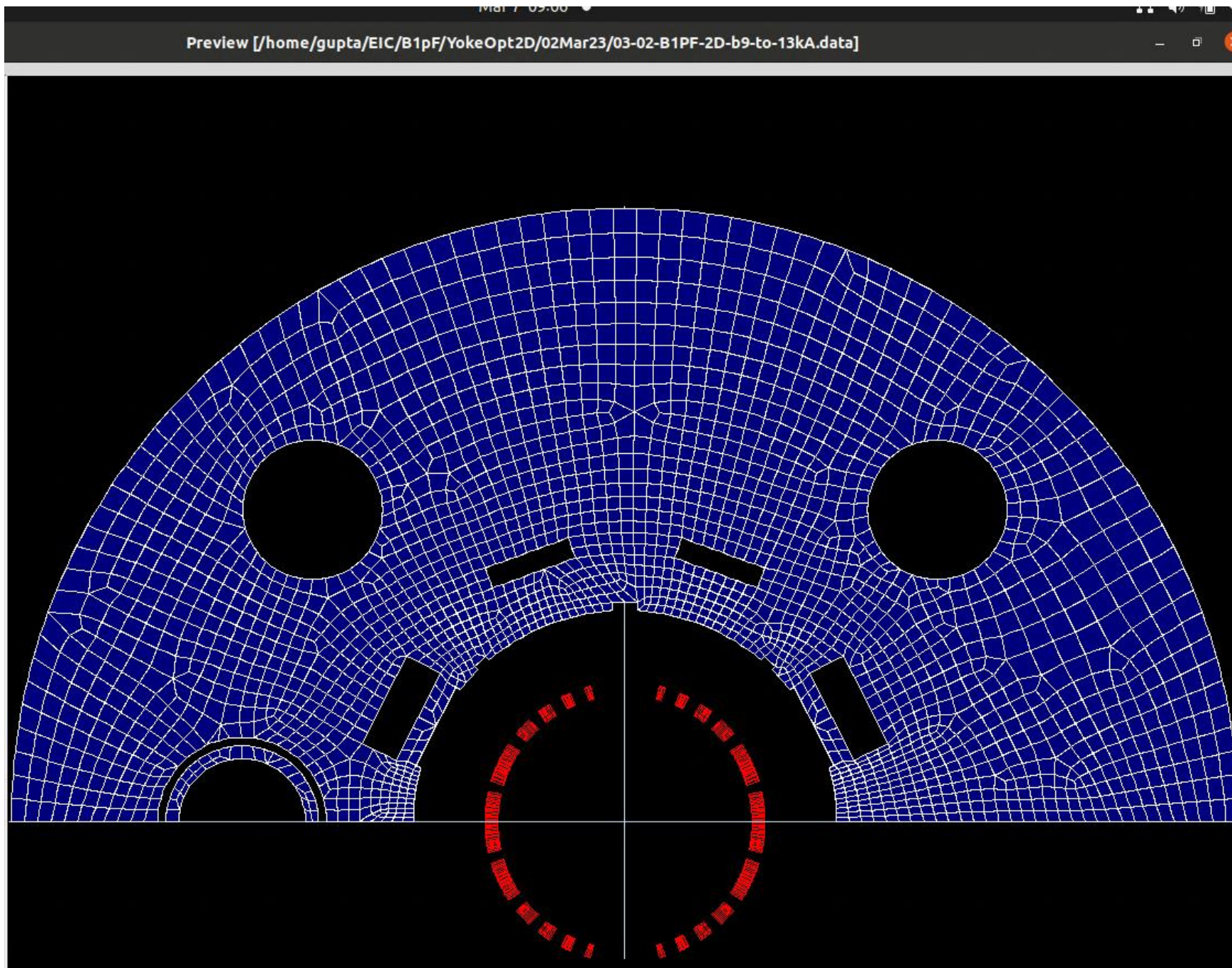
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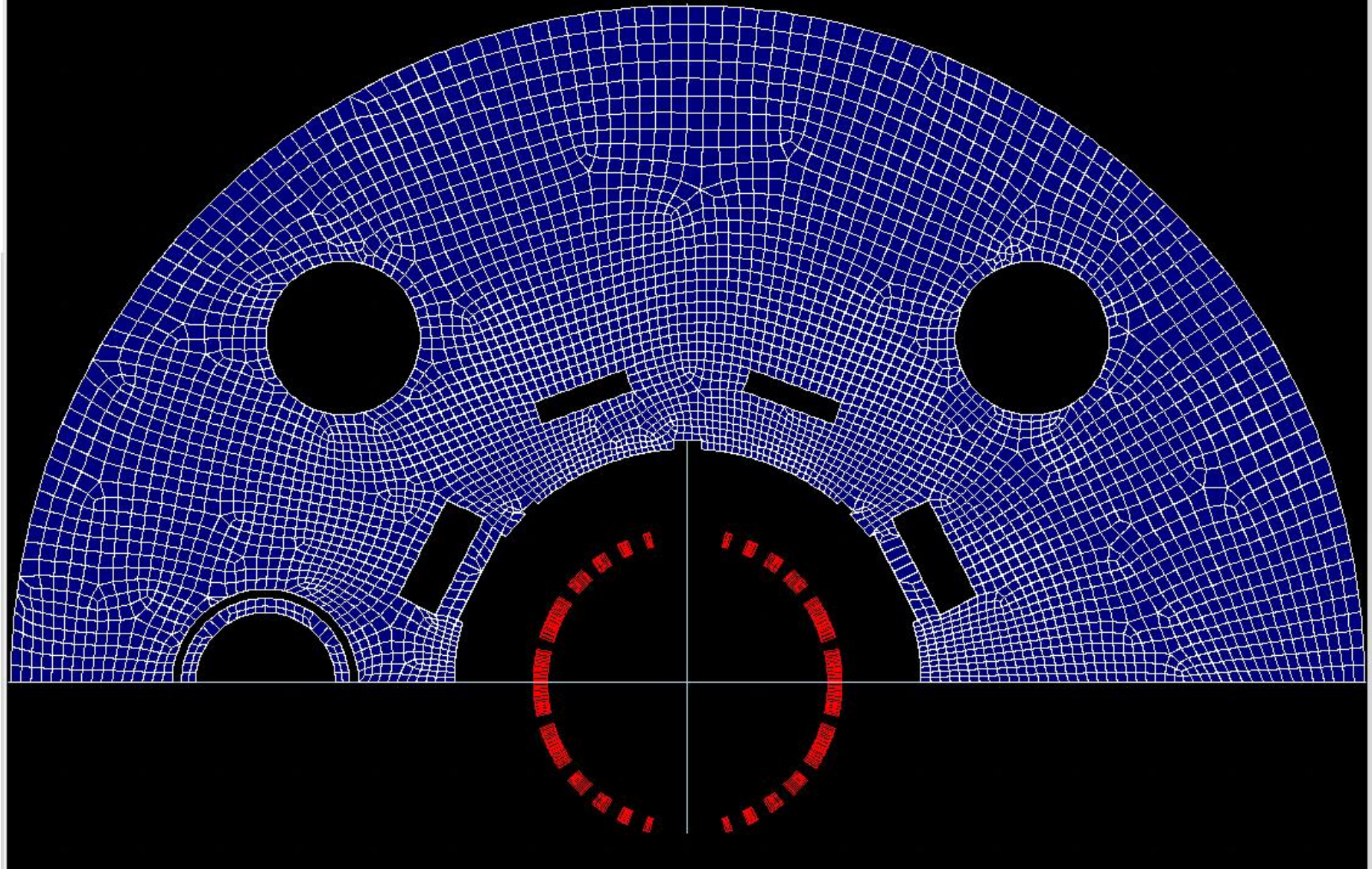


This can be refined further. As such, we are in a good position

Iron Mesh Used



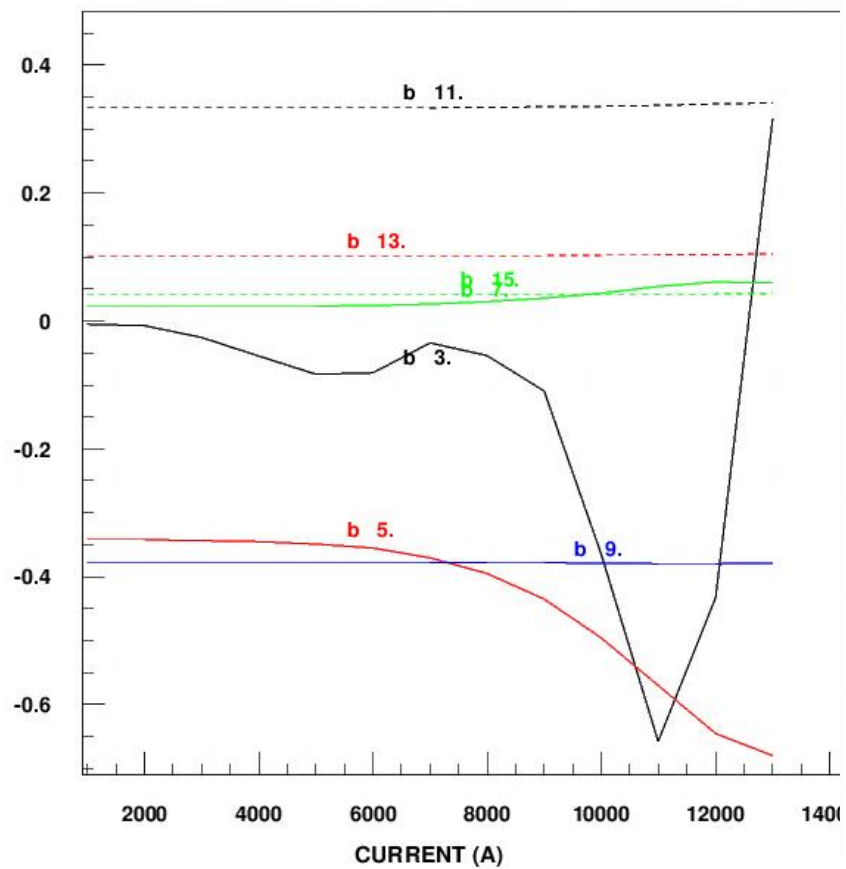
Iron Mesh Further Refined



B1pF Yoke inner yoke od 26

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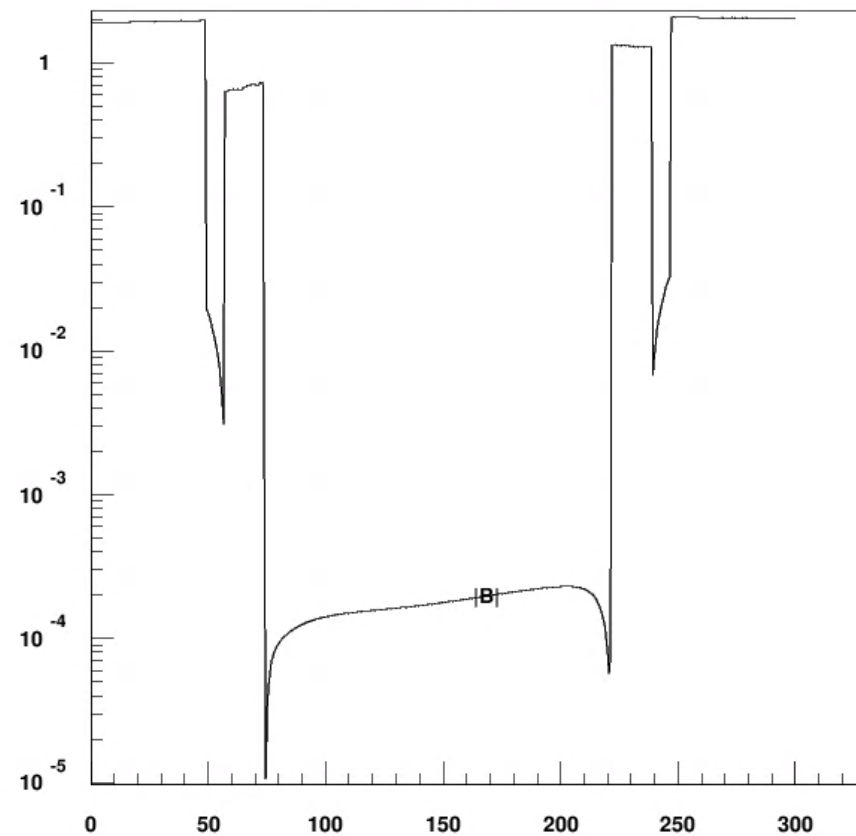
GRAPH NO: 1. 2. 3. 4. 5. 6.



B1pF Yoke inner yoke od 26

23/03/04 06:25

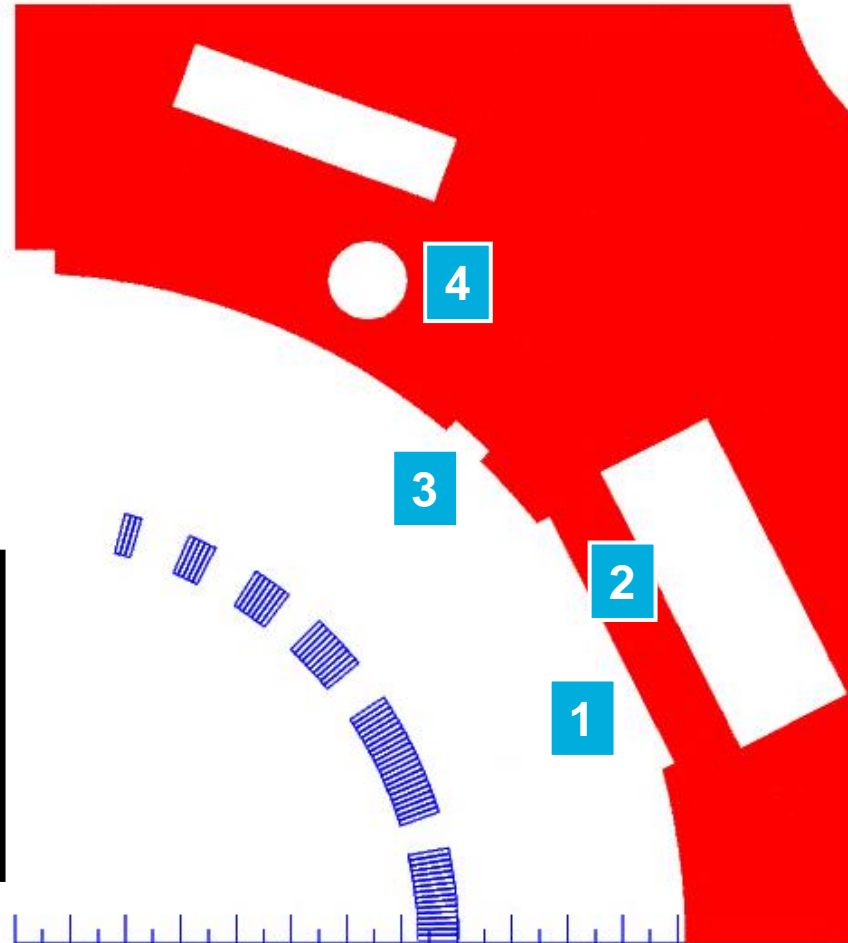
GRAPH NO: 9.



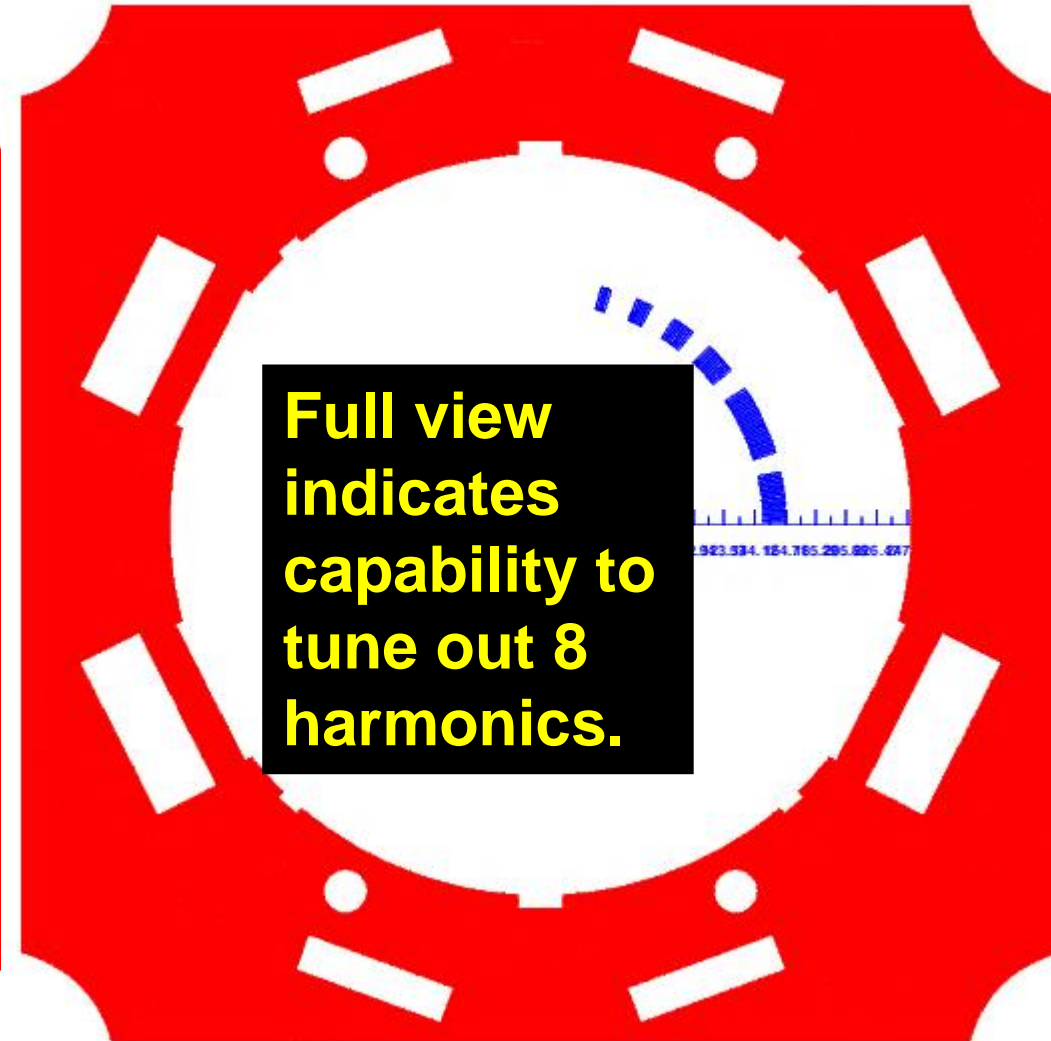
Results didn't change much on making mesh denser near cutout regions. Means we are ok.

Incorporating Future Tuning Capabilities

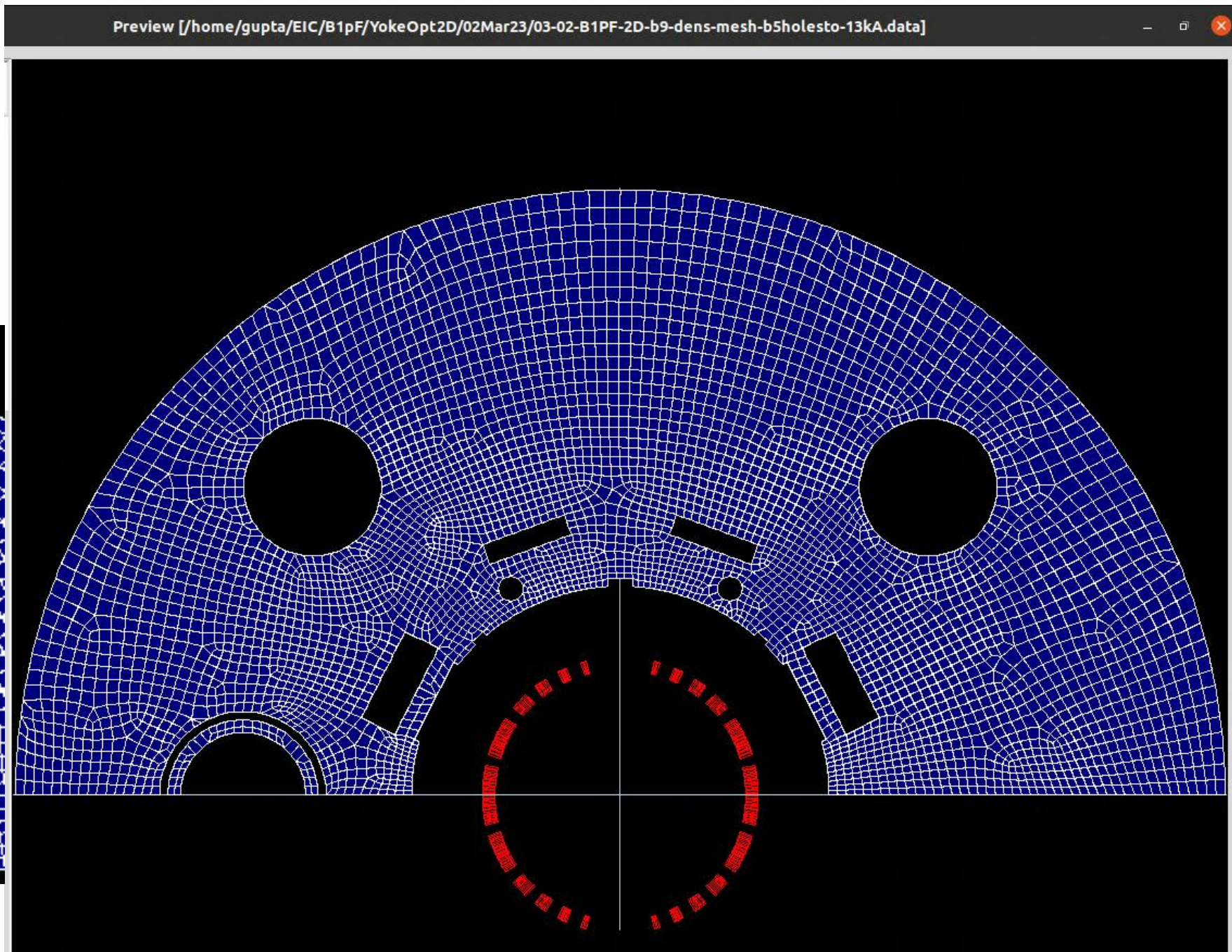
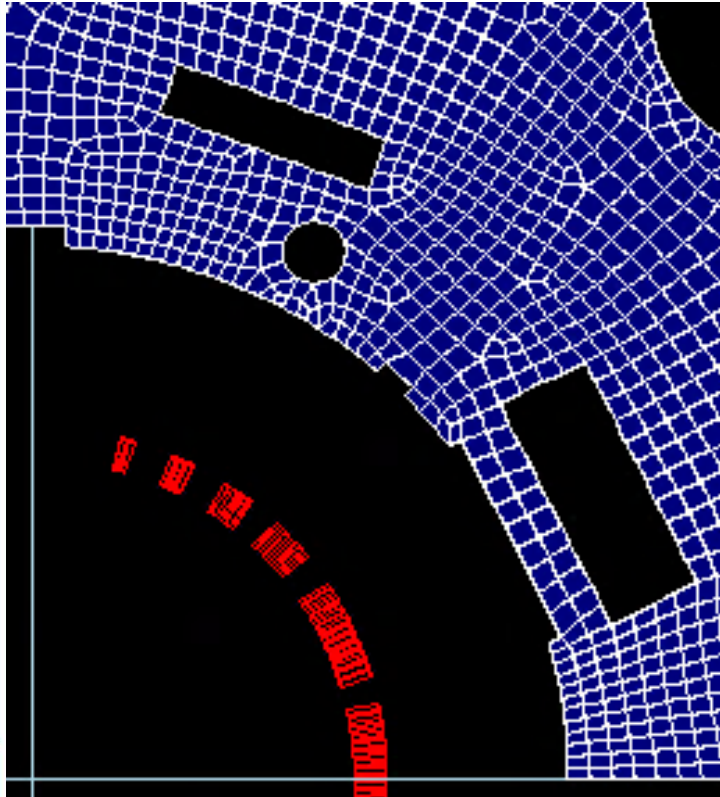
1. b_3 geometric
2. b_3 saturation
3. b_5 geometric
4. b_5 saturation



Larger iterations can be done in coil via pole and midplane shims



Thoughts on Future Tuning



Example of Tuning in Saturation

