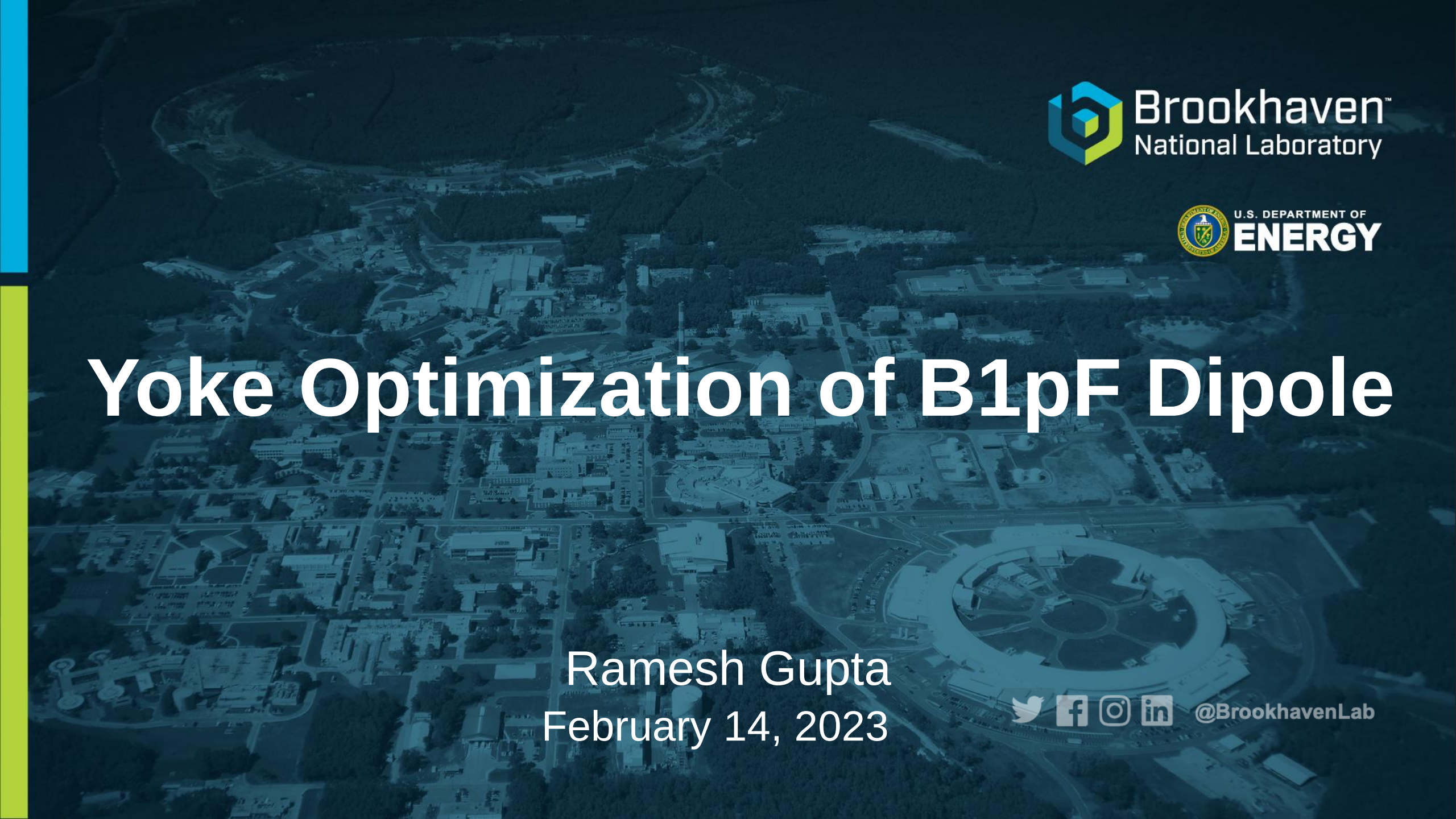

Brookhaven National Laboratory

U.S. DEPARTMENT OF ENERGY

Yoke Optimization of B1pF Dipole

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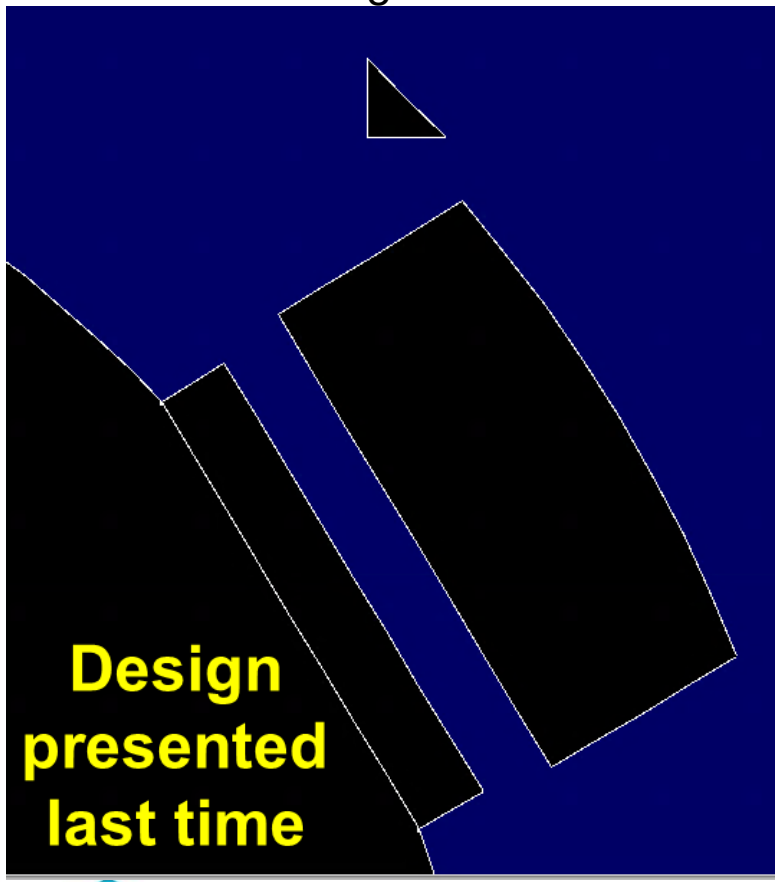
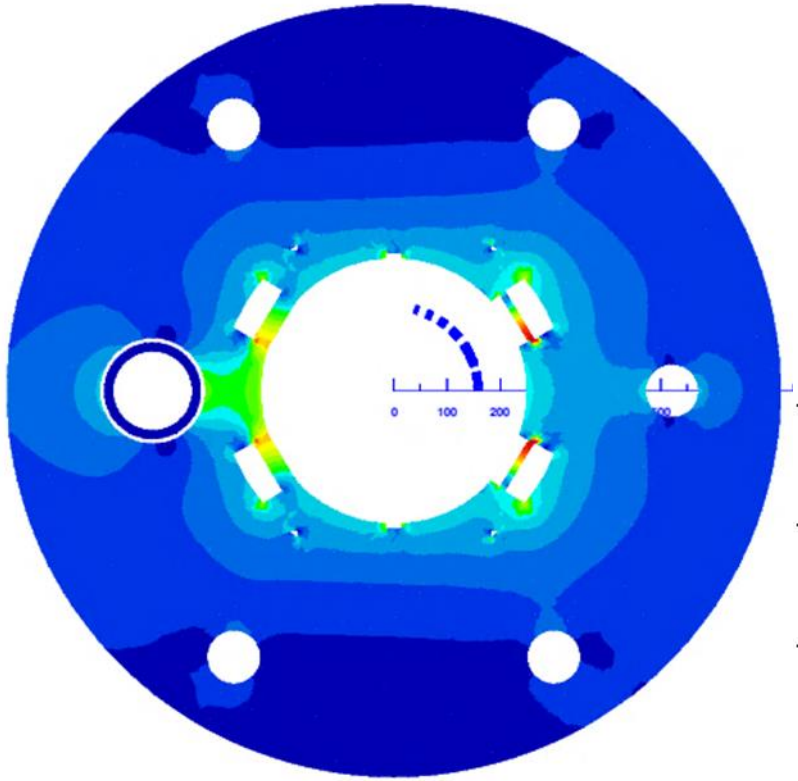
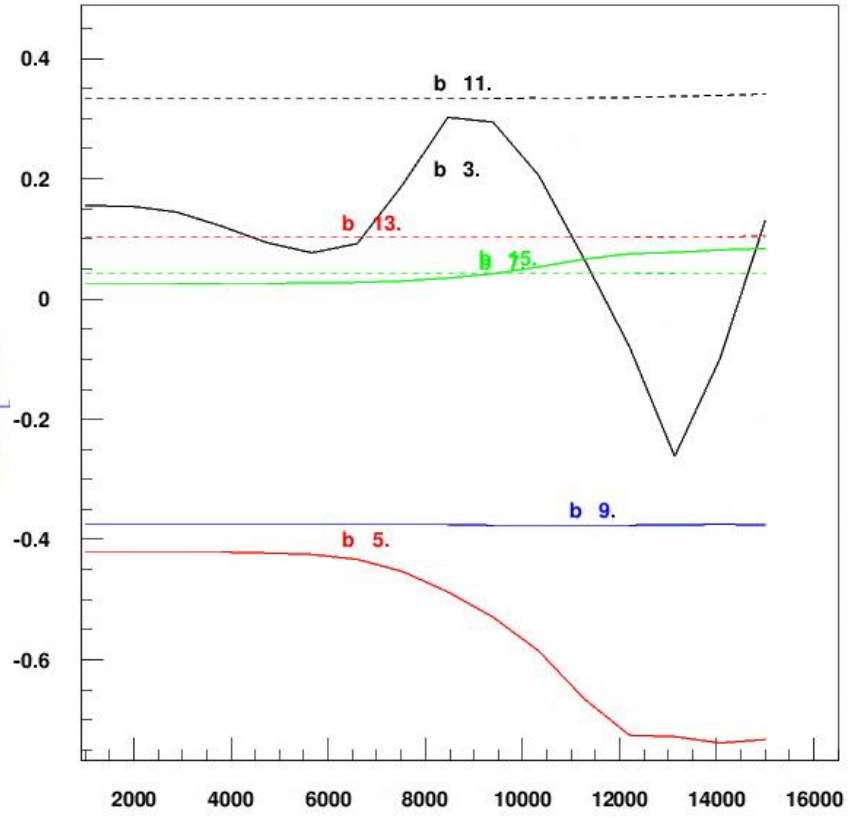
@BrookhavenLab

Further Yoke Optimization (inner and outer)

- Include more features in inner yoke (redo saturation optimization)
- Increase the diameter of the heat exchanger hole from 4” to 6.5” while maintain field quality and enough to keep fringe field low
- Reduce b_5 saturation

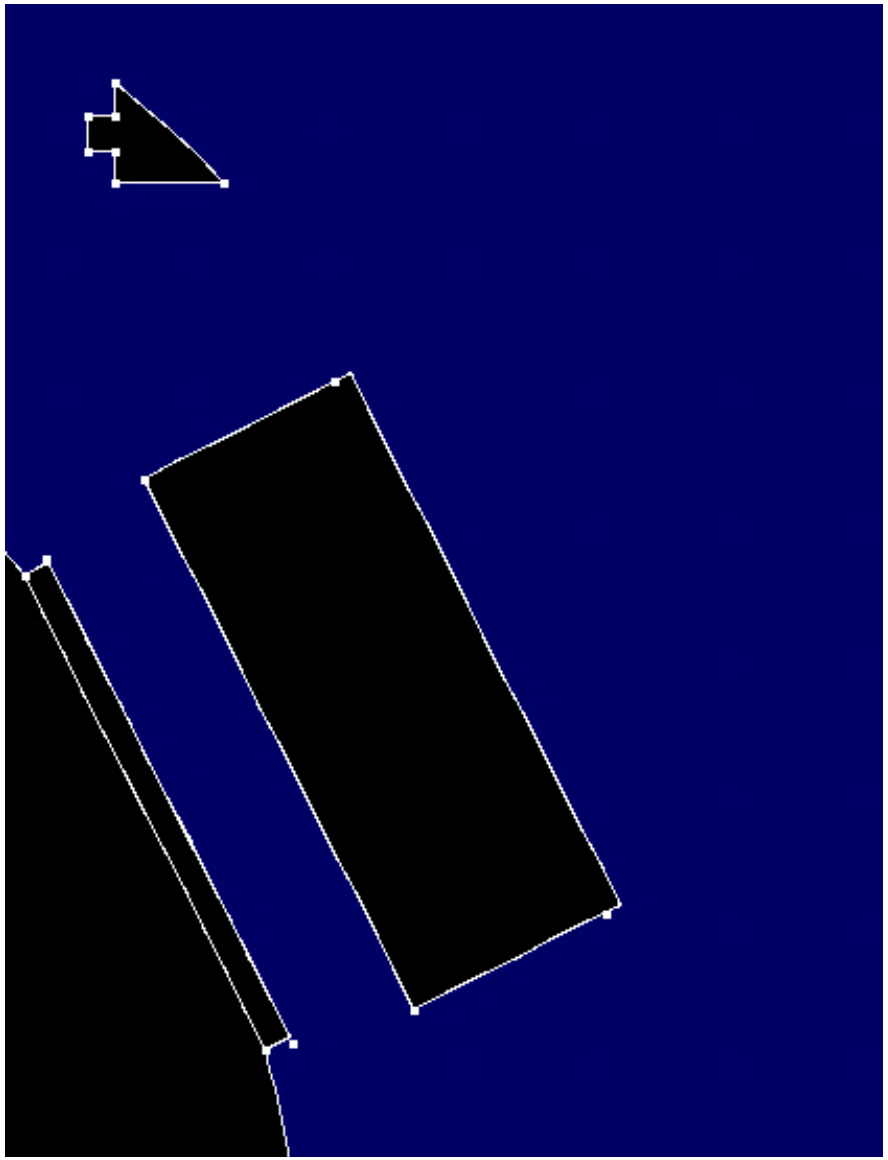




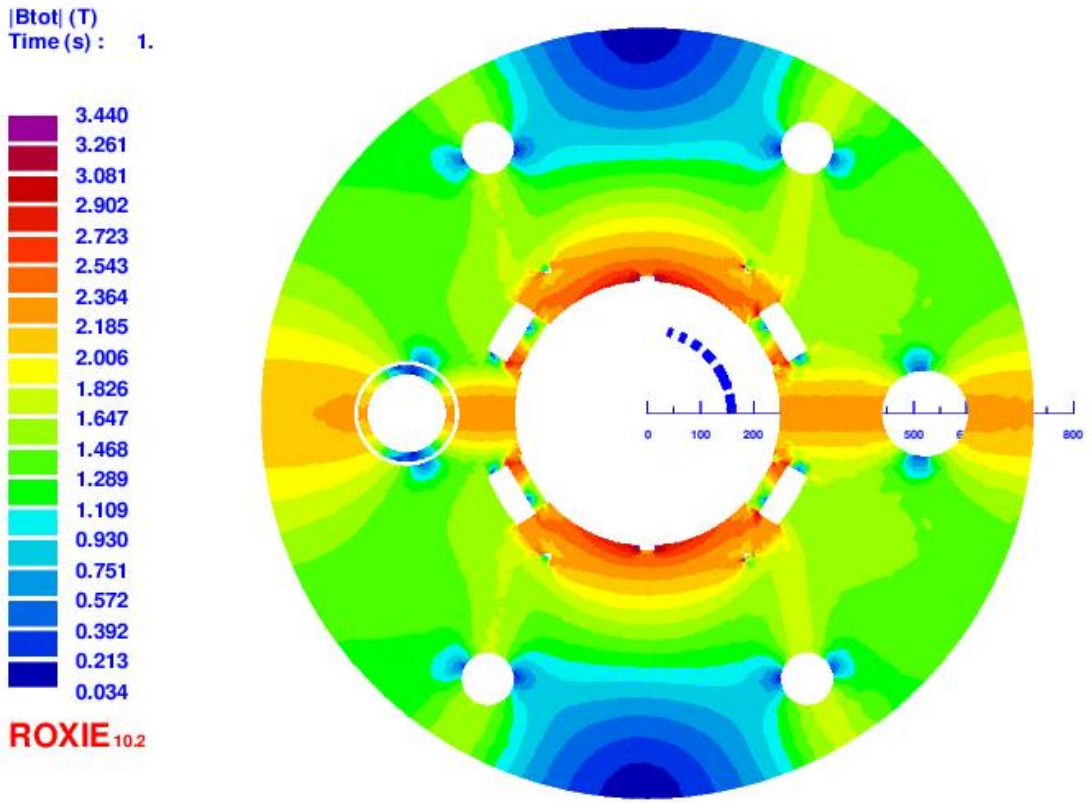


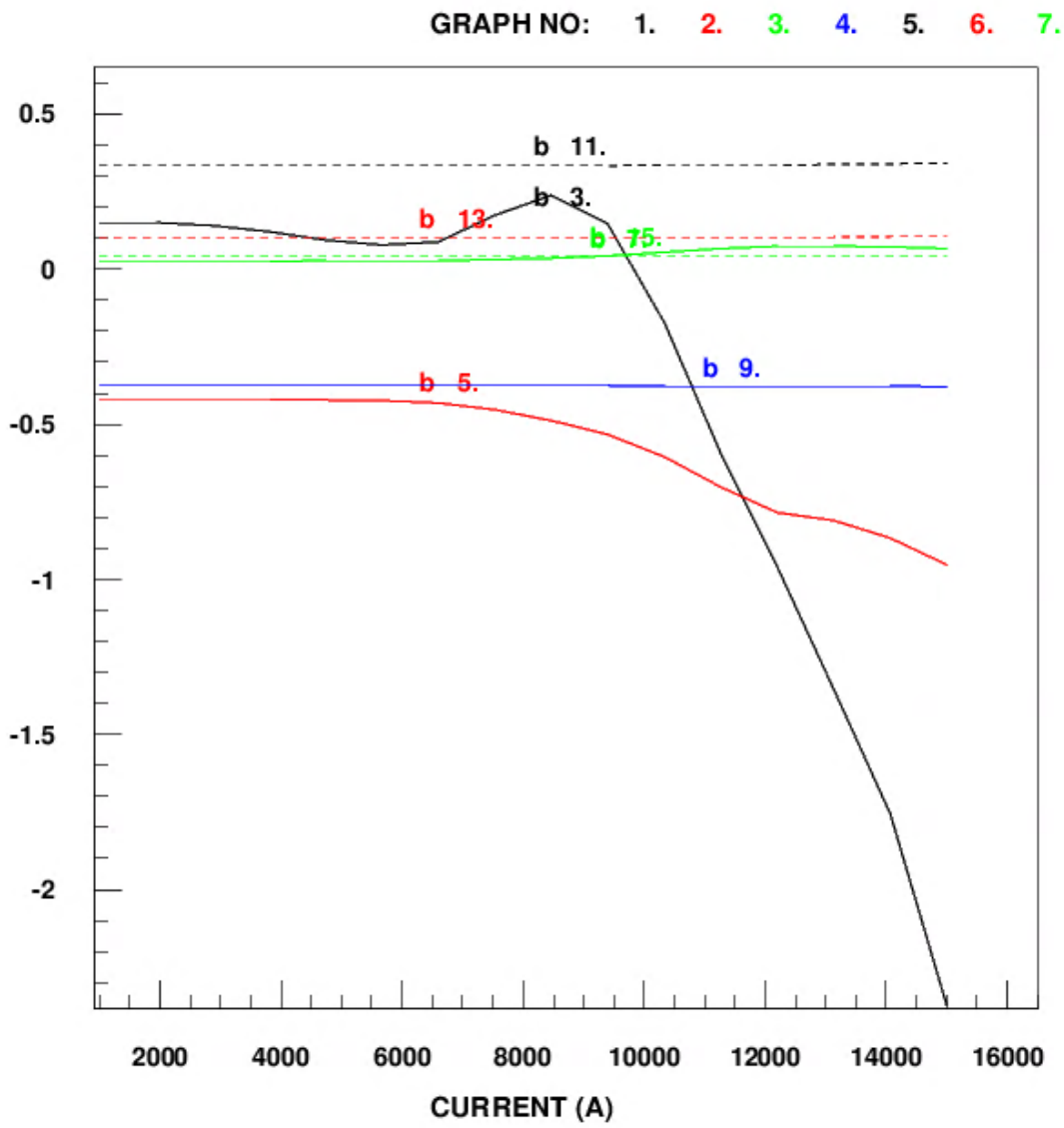
Feedback from the Mechanical Design Incorporated

- Details of the features for the inner yoke lifting fixture included.
- Larger cutouts for bars for ends structure incorporated.
- Location and size of the rectangular cutout optimized to keep saturation induced harmonics low.



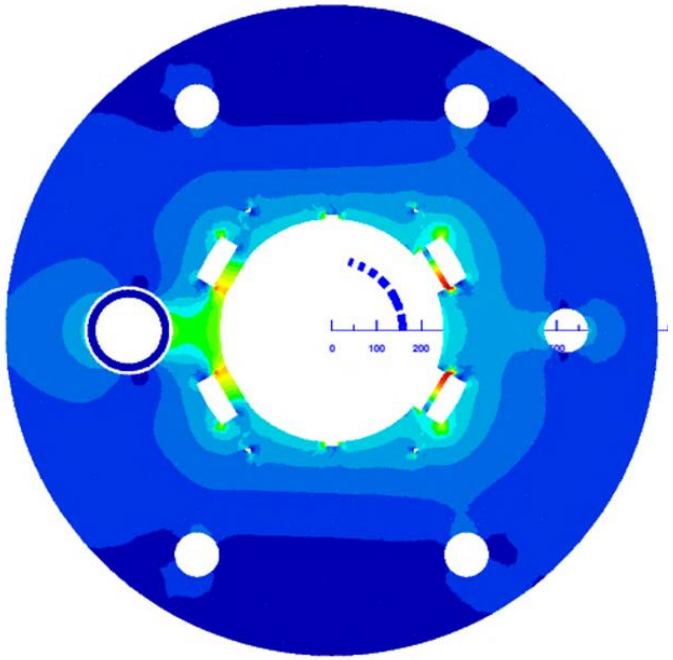
Larger Size (6.5”) Heat Exchanger Hole



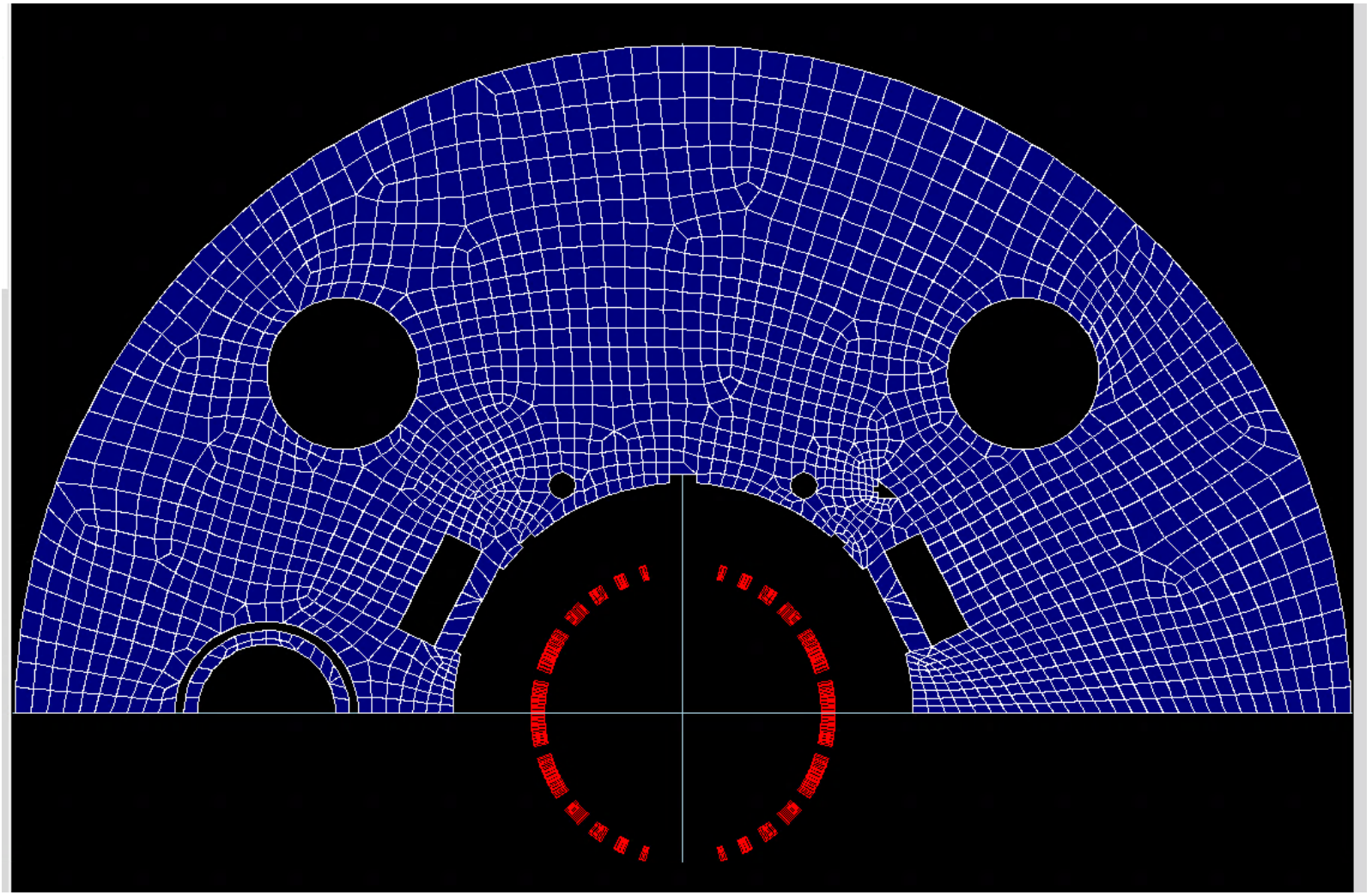


- b_3 saturation becomes bad
- Must also impact fringe field

Larger Size Heat Exchanger Hole at 45º

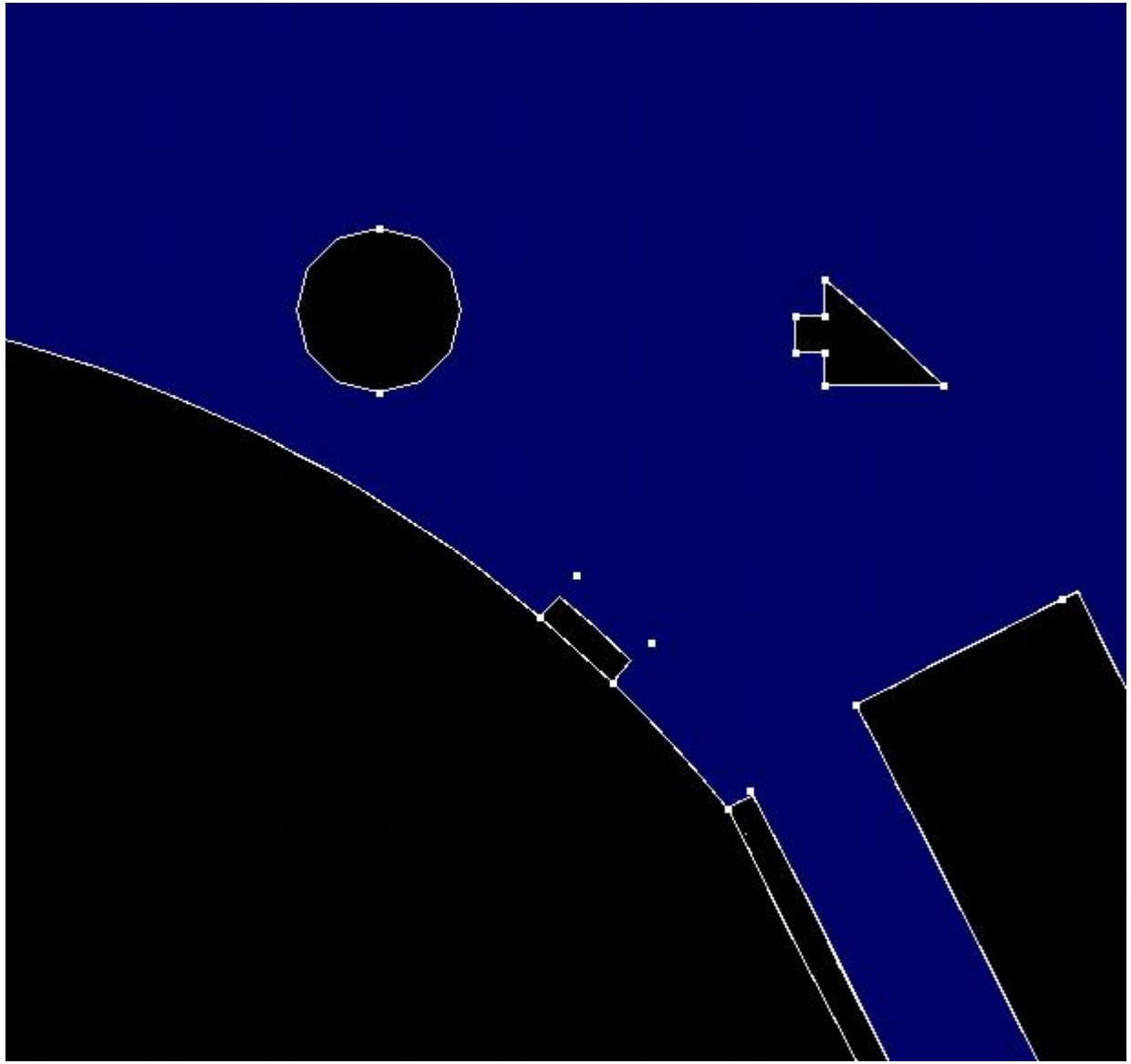


- The diameter of heat exchanger hole increased from 4” to of 6.5”.
- Holes moved from 0 to 45 to avoid removing iron from midplane.
- Should be ok in other magnets also. But check.



Inner Yoke Updated for b_5 harmonic

- Additional hole for reducing b_5 saturation
- Size and location optimized
- Additional cutout for geometric b_5 tuning – not fully optimized yet (may be ok for now)

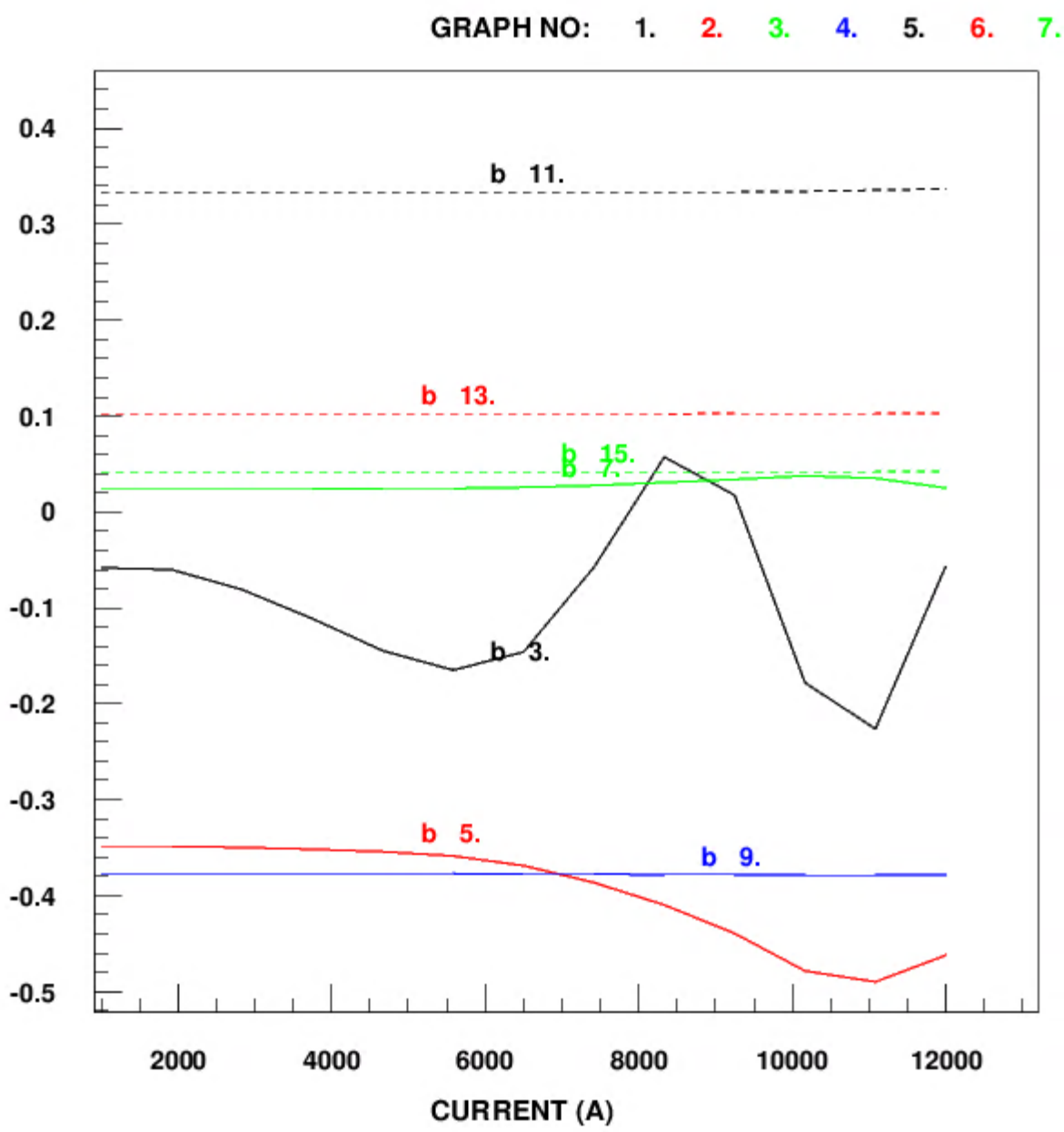


Results of the optimized yoke

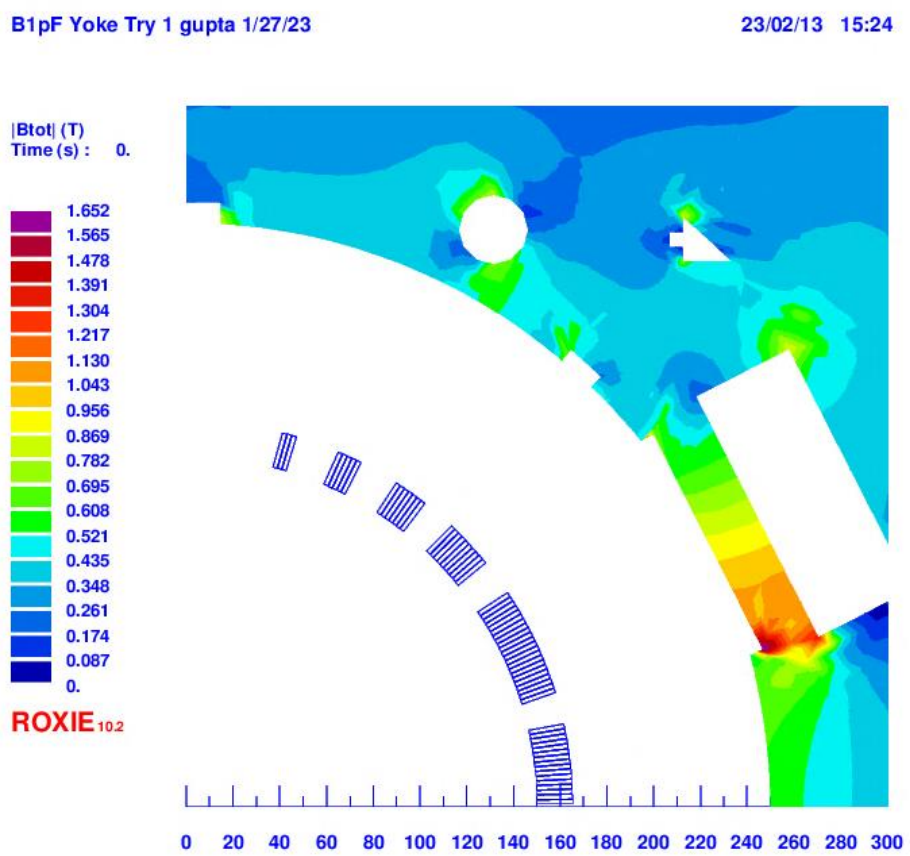
All harmonics remain low (1/2 unit) throughout the entire range of operation with all requested mechanical and cryogenic features included in the design.

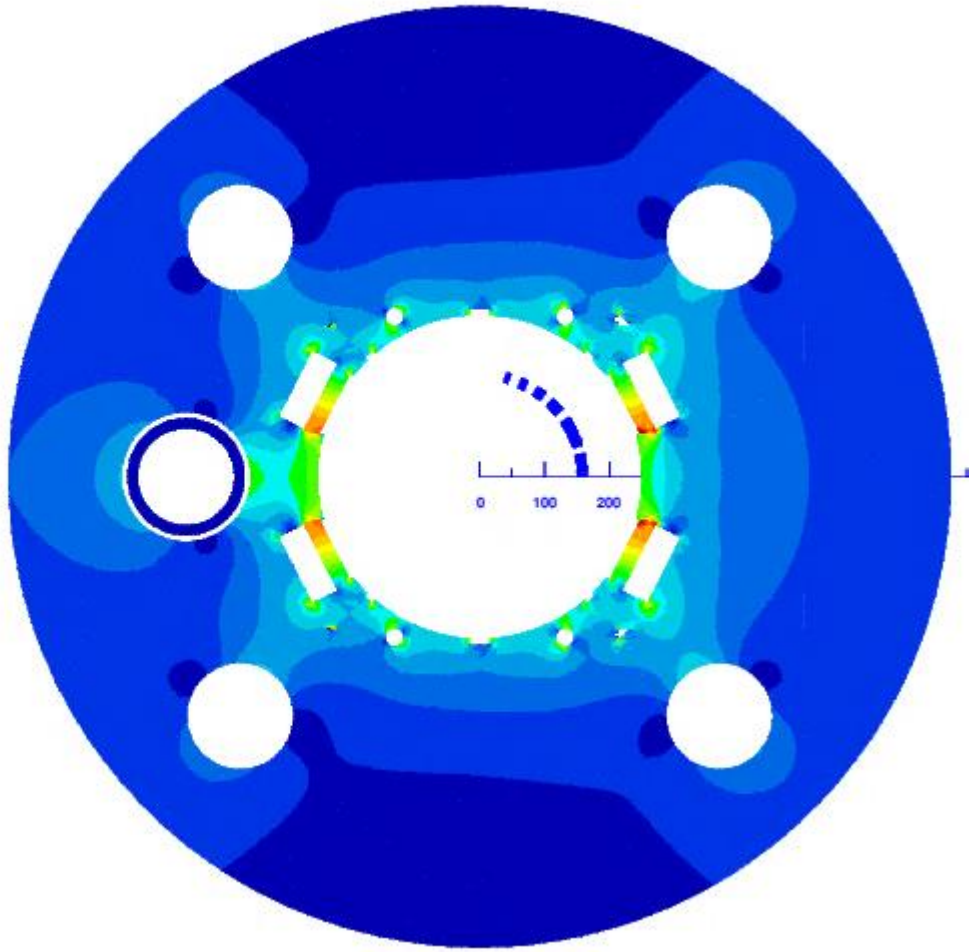
Saturation control knobs are efficiently used.

Only minor optimization remaining – b_5 tuning (shouldn't cause delay)



New Yoke (flux at low field)





New Yoke (flux at high field)