

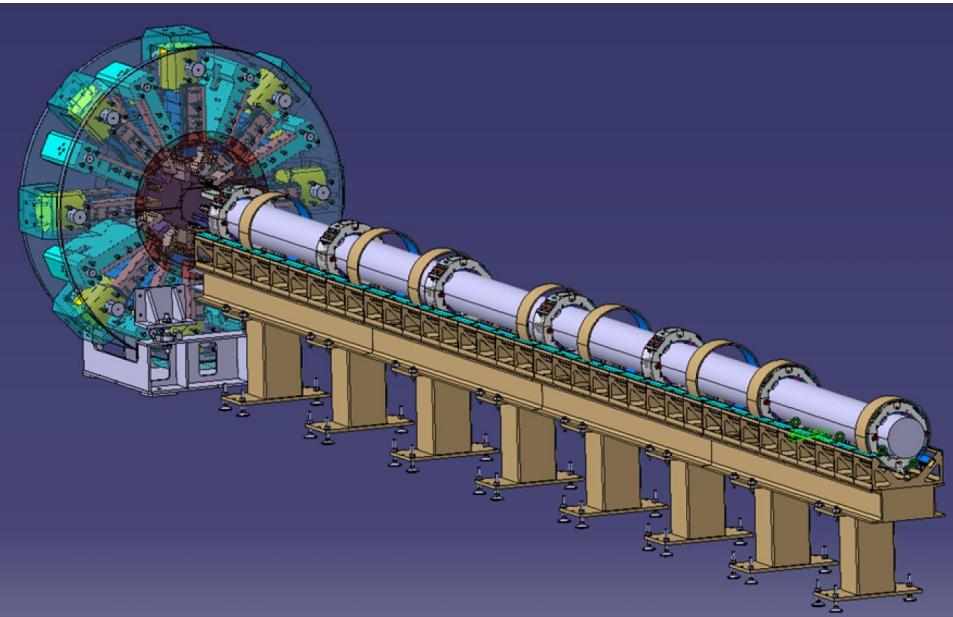
# Some LHeC IR Magnet Options Part 2

Brett Parker, BNL/SMD



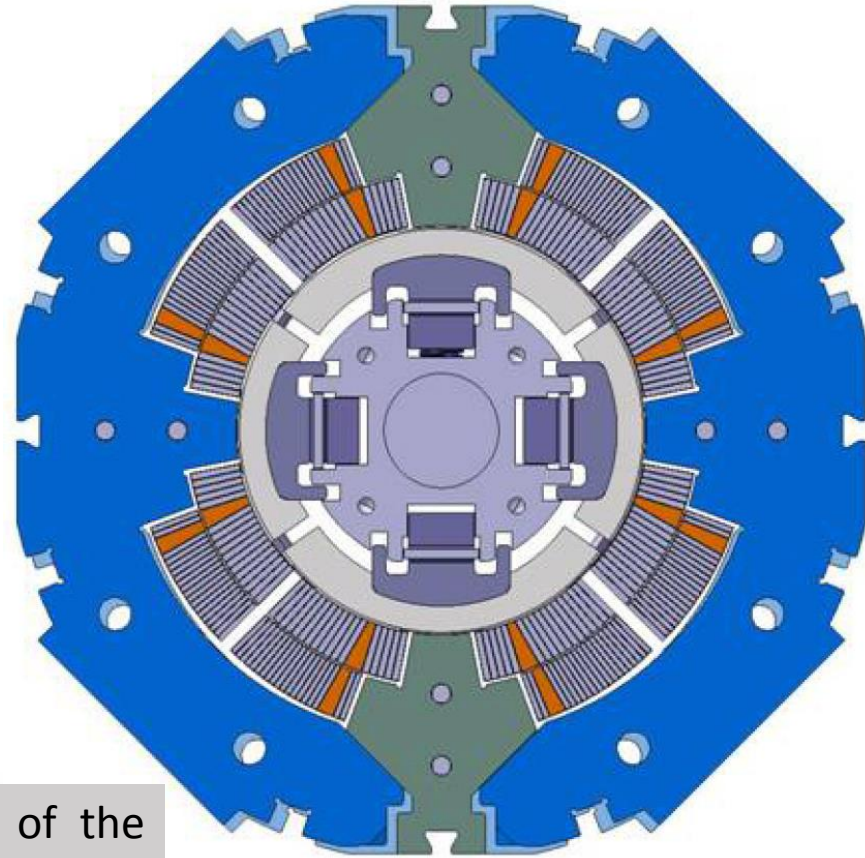
Electron Ion Collider – eRHIC

# How to make a self-contained coil.



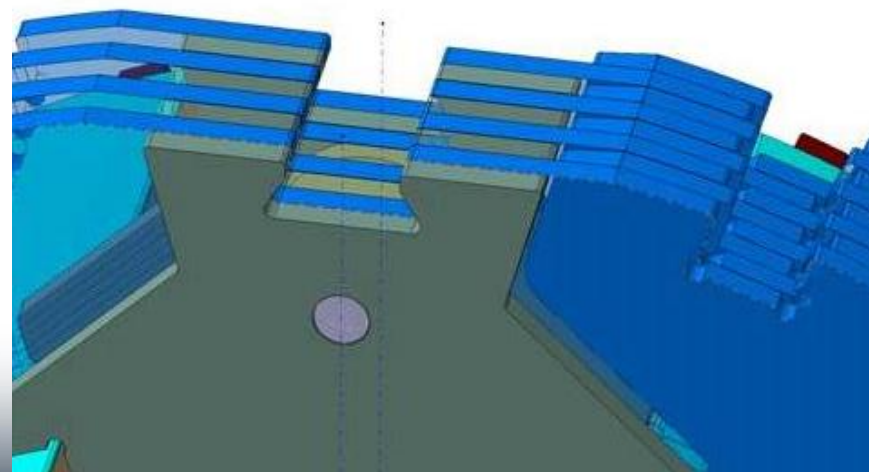
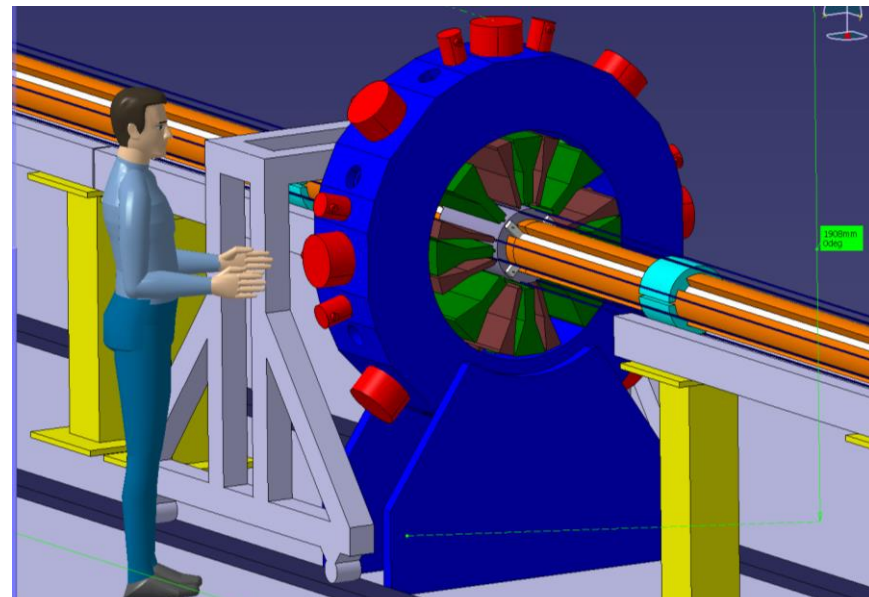
**Artist's view of the horizontal collaring press with a coil-support bench.**

**Spring-loaded, collapsible assembly mandrel with collar pack position prior to collaring.**

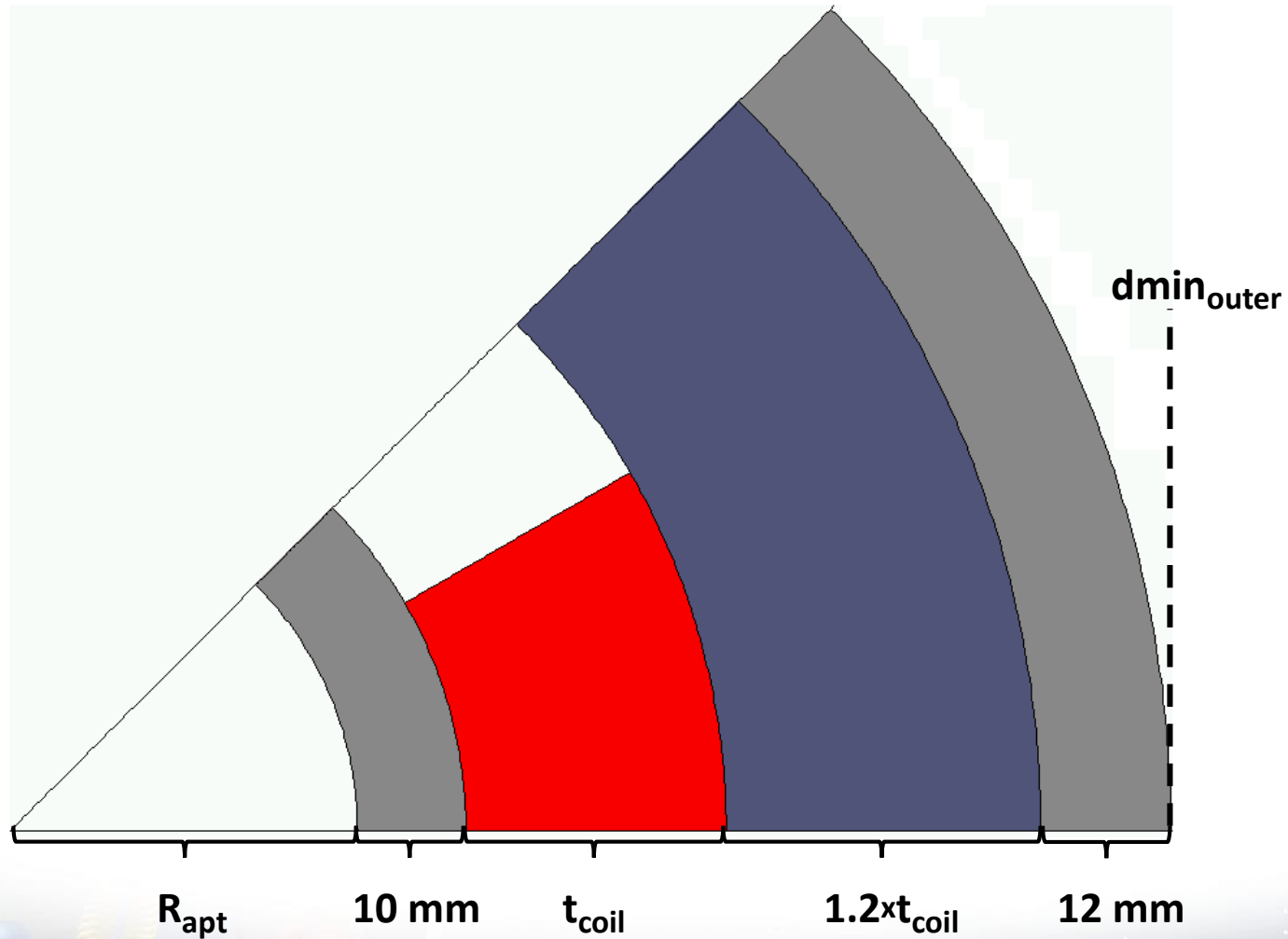


S. Russenschuck, for WP-6 project team, "Design of the Inner Triplet Magnets for a Luminosity Upgrade of the LHC."

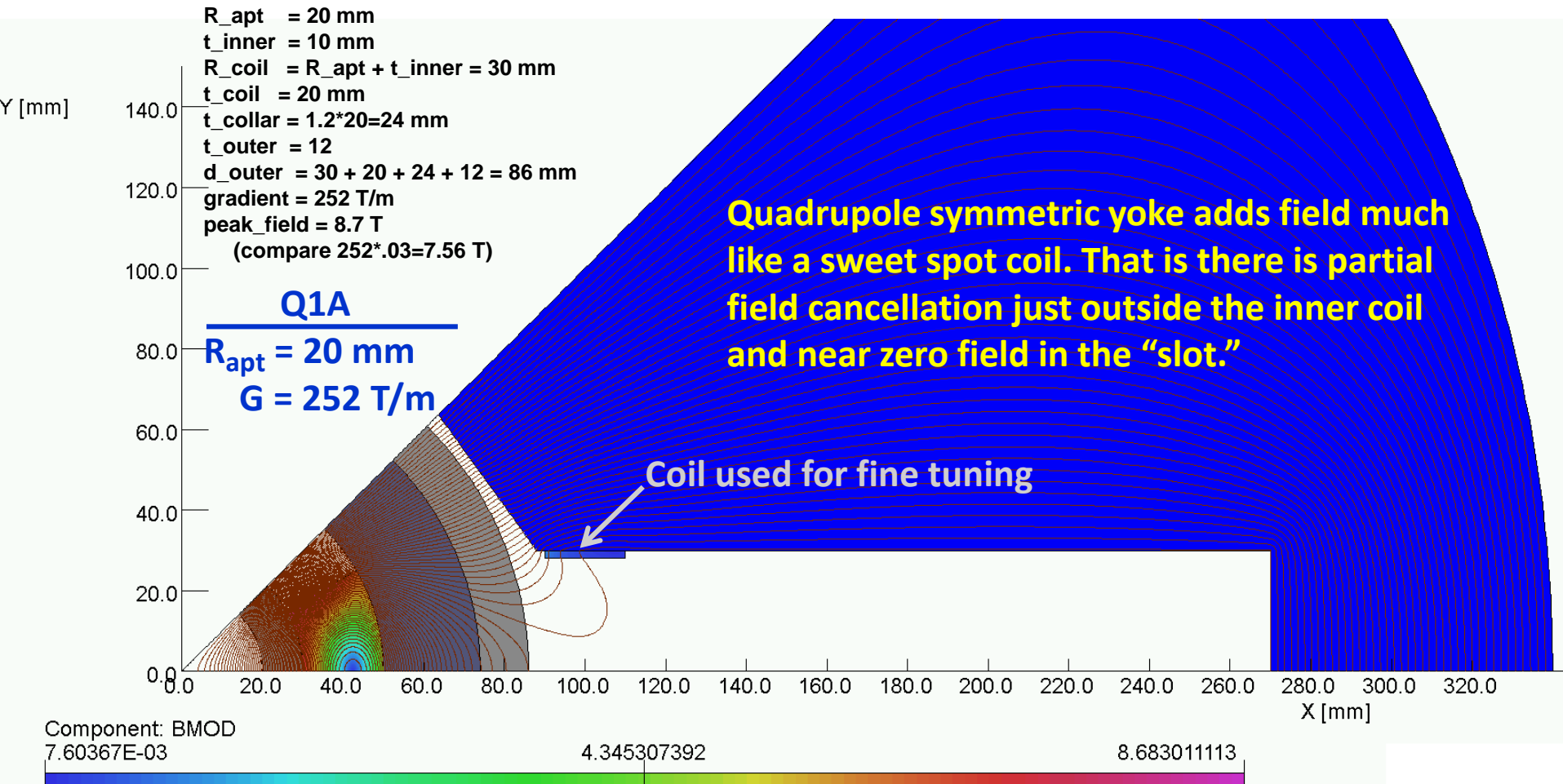
# How to make a self-contained coil.



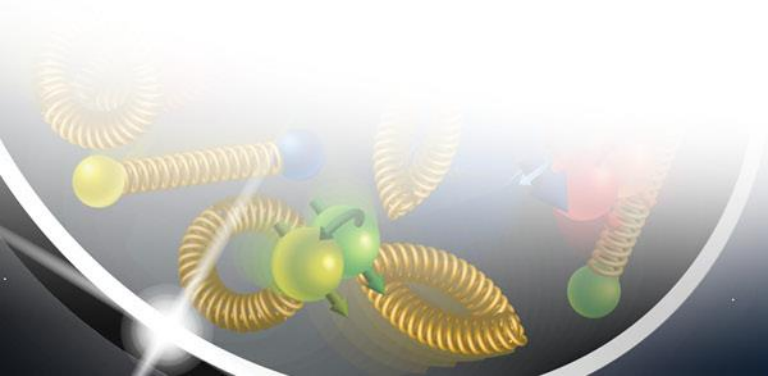
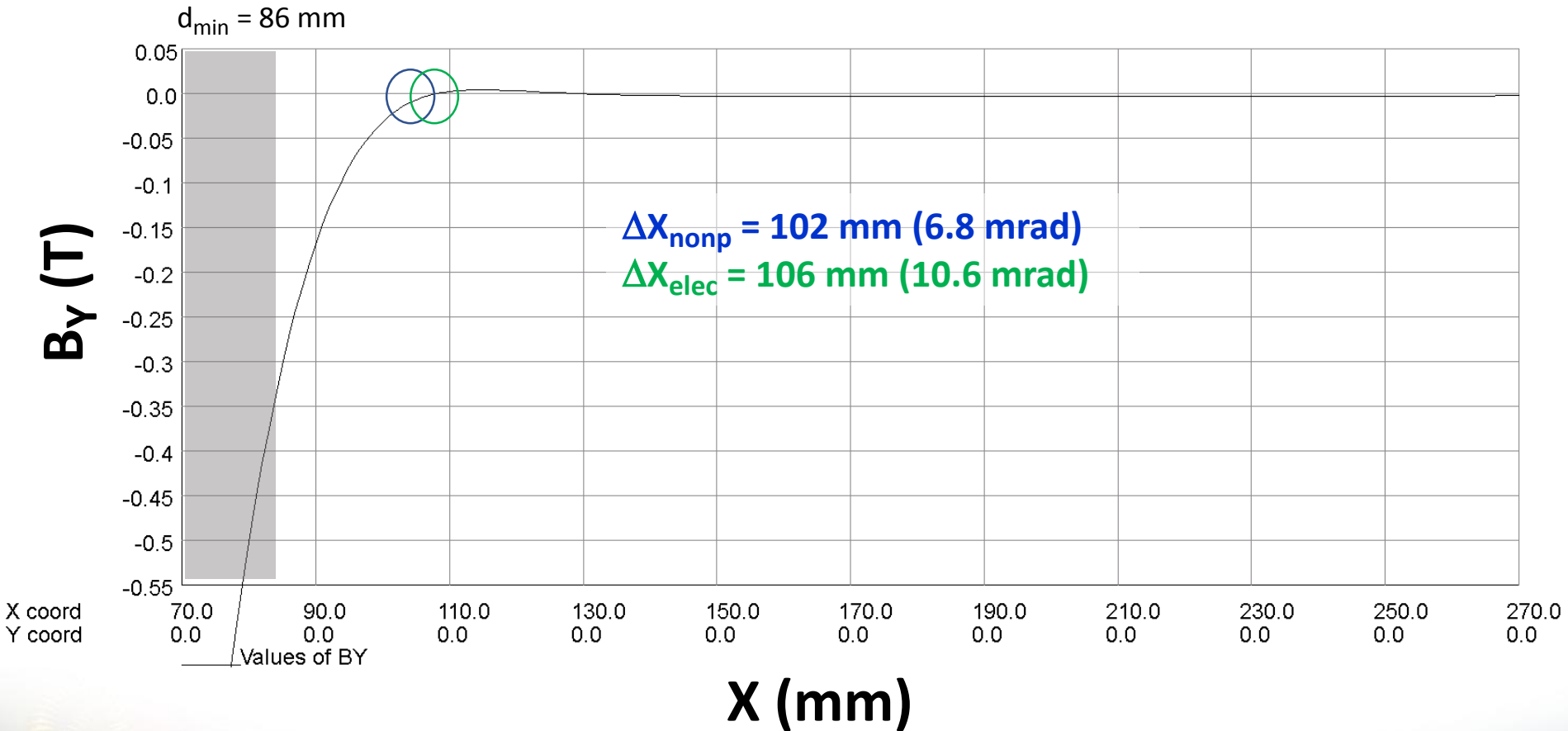
# Self-contained coil assumptions.



# Self-contained coil plus quad yoke.

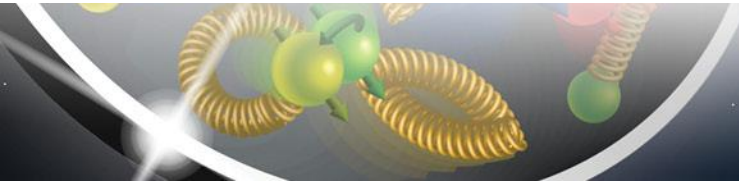
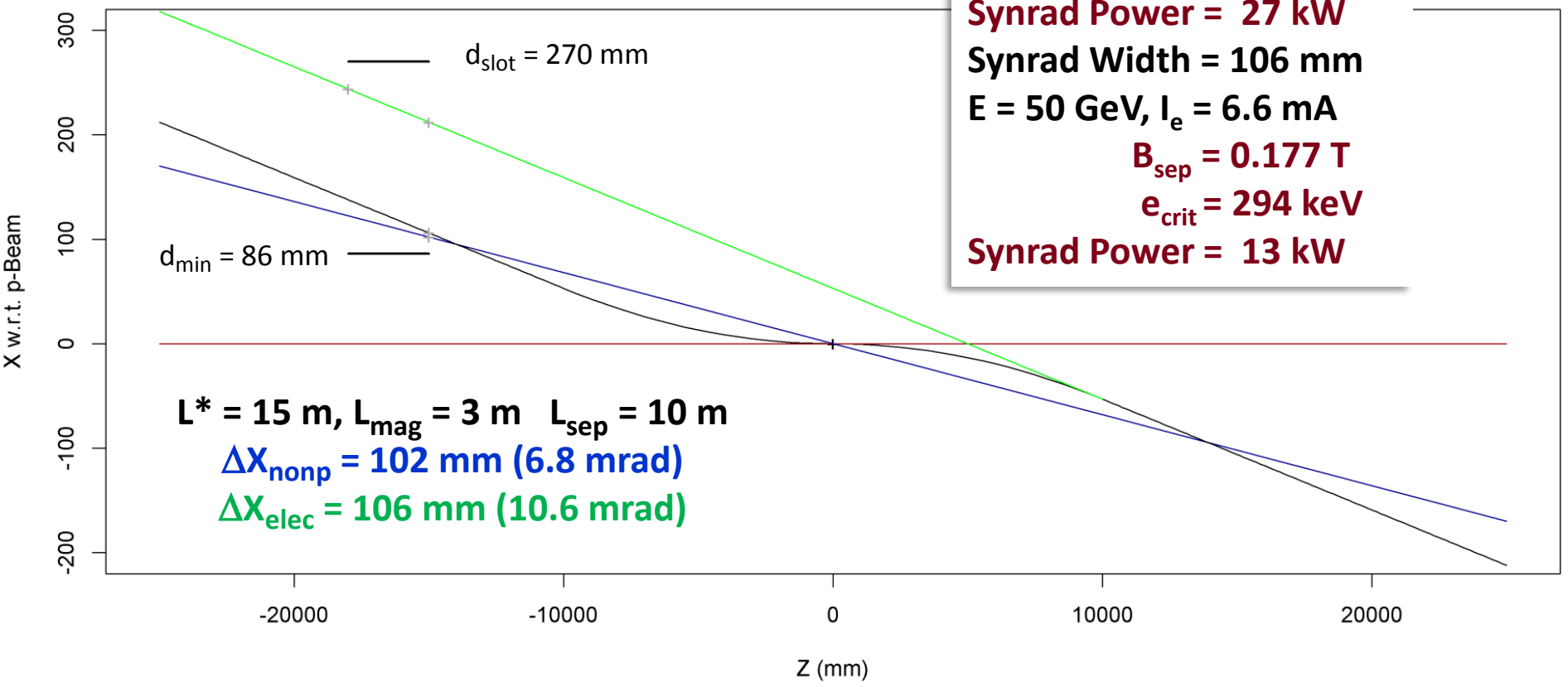


# 20 mm slot quadrupole field profile.

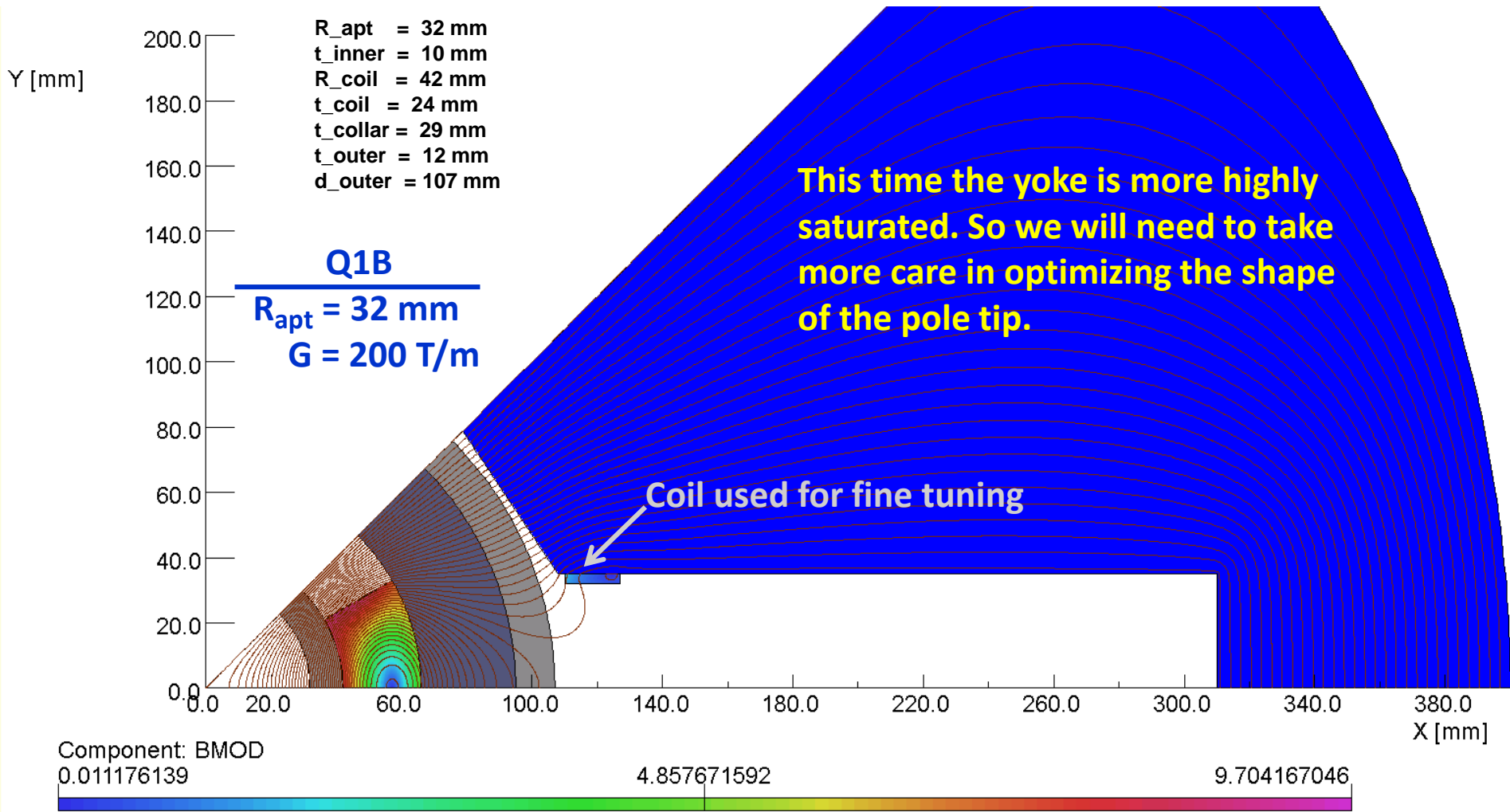


# 20 mm slot quadrupole IR geometry.

**E = 60 GeV, I<sub>e</sub> = 6.6 mA**  
**B<sub>sep</sub> = 0.212 T**  
**e<sub>crit</sub> = 508 keV**  
**Synrad Power = 27 kW**  
**Synrad Width = 106 mm**  
**E = 50 GeV, I<sub>e</sub> = 6.6 mA**  
**B<sub>sep</sub> = 0.177 T**  
**e<sub>crit</sub> = 294 keV**  
**Synrad Power = 13 kW**

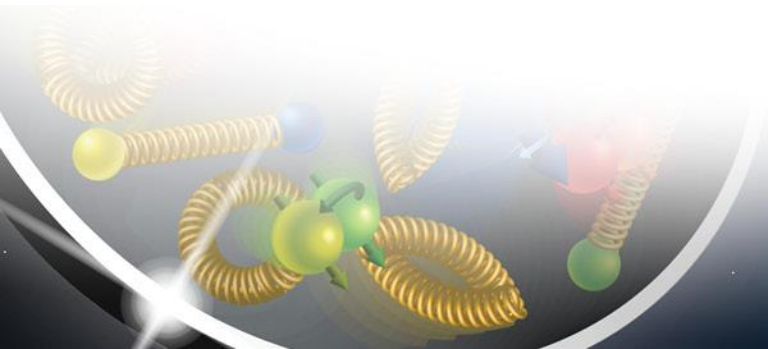
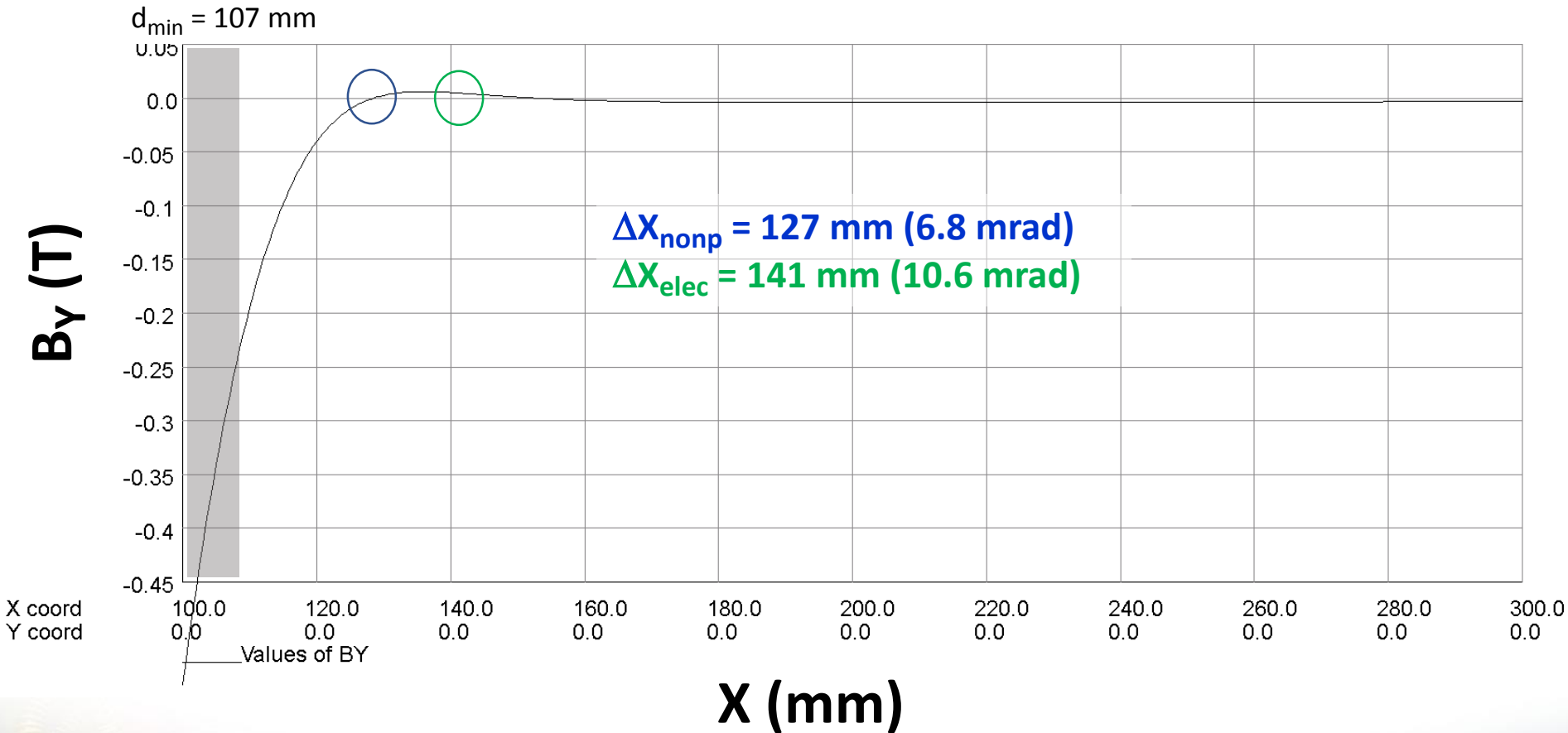


# 32 mm slot quadrupole parameters.

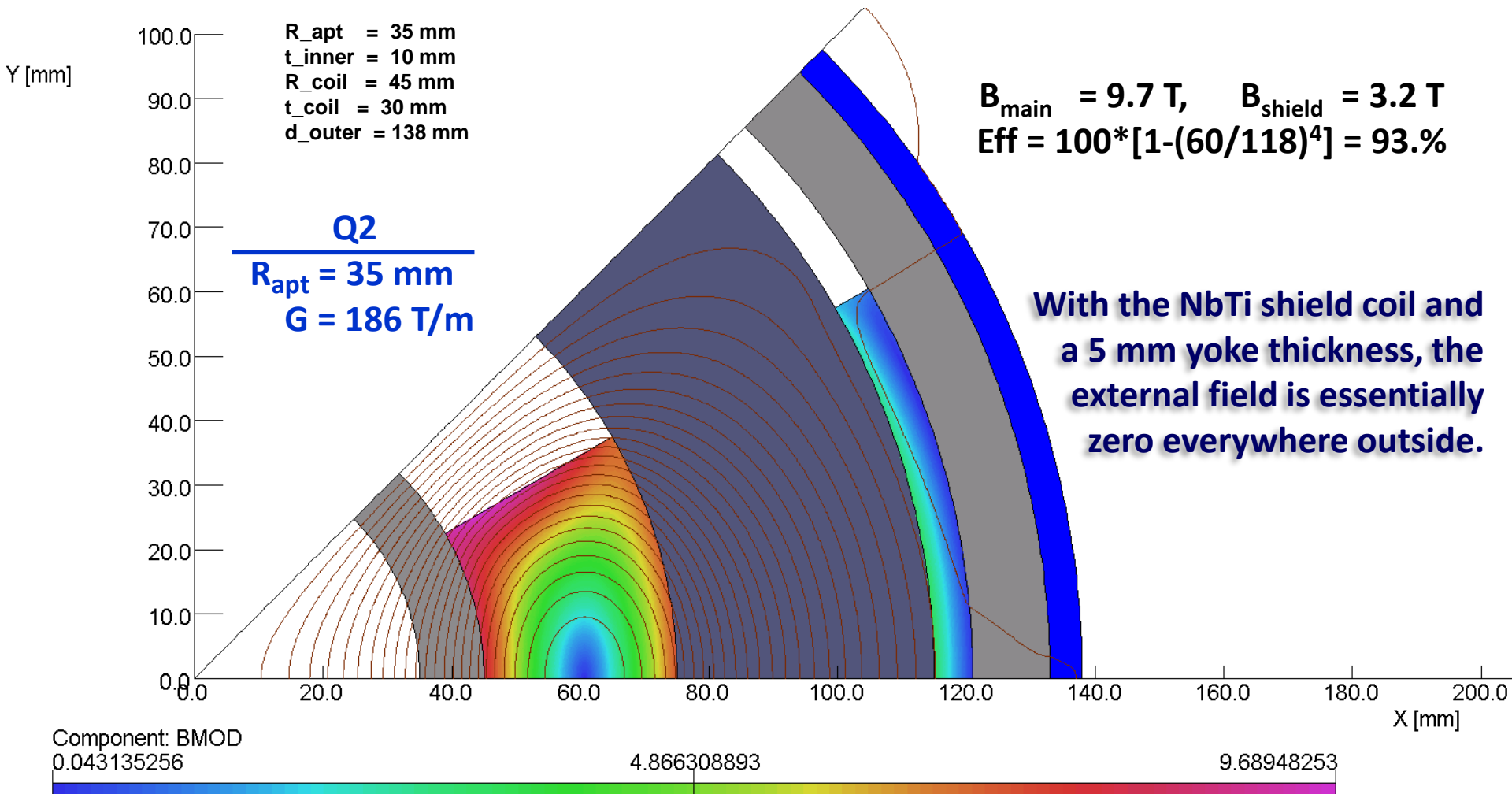




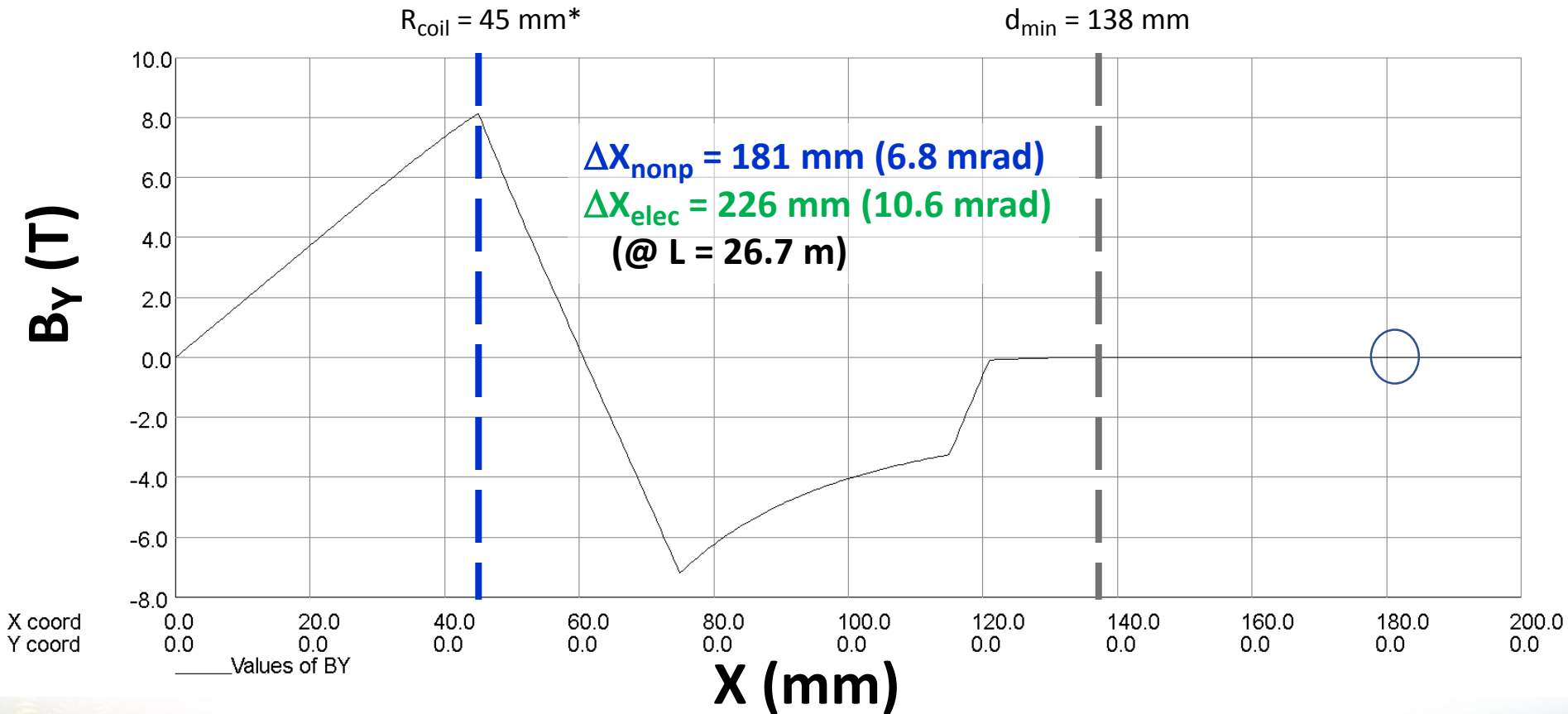
# 32 mm slot quadrupole field profile.



# 35 mm actively shielded quad.

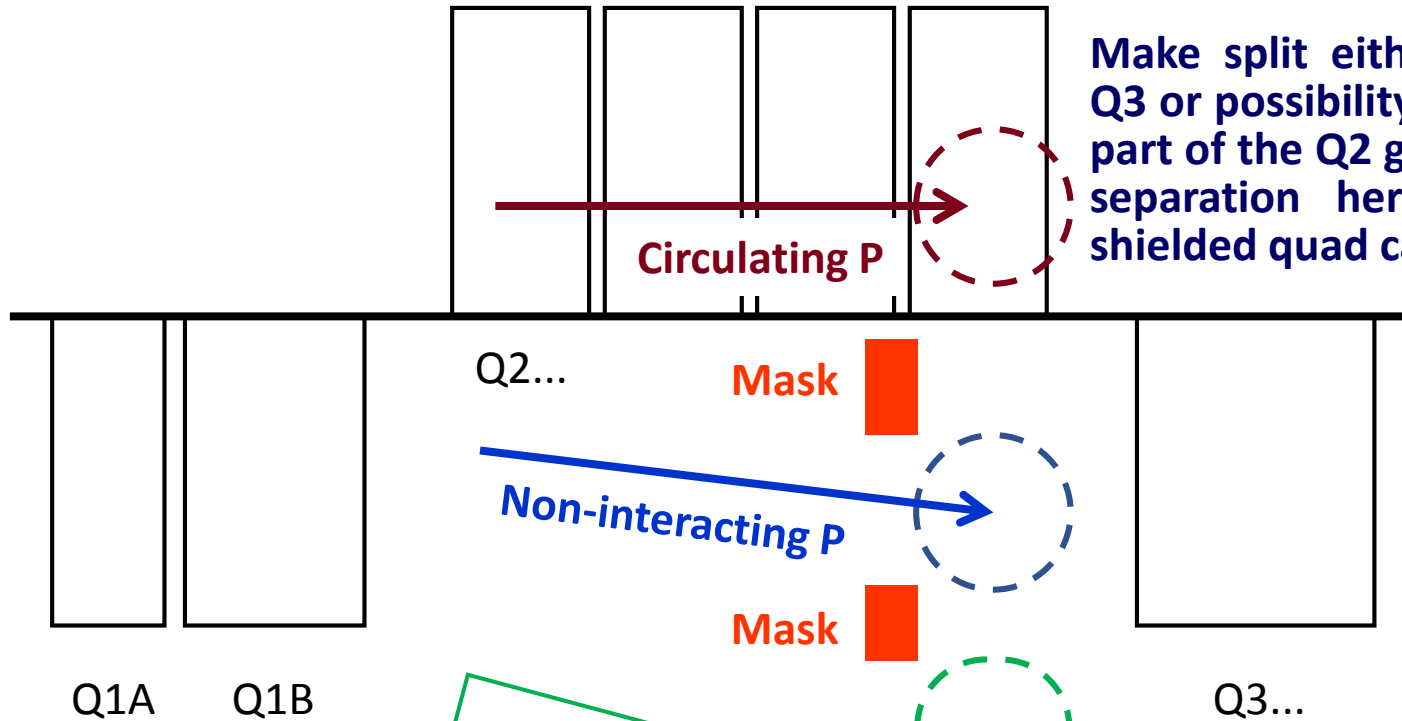


# 35 mm actively shielded field profile.



\*Early LARP coil prototypes had 45 mm coil radius.

# Some further layout thoughts.



Make split either between Q2 and Q3 or possibility overlapping the last part of the Q2 group. There is a large separation here and the actively shielded quad can be well protected.

Before we get to Q3 group it would be nice to get into independent beam pipes. Then Q3 could be a more “standard” quad design and again have higher gradient.

