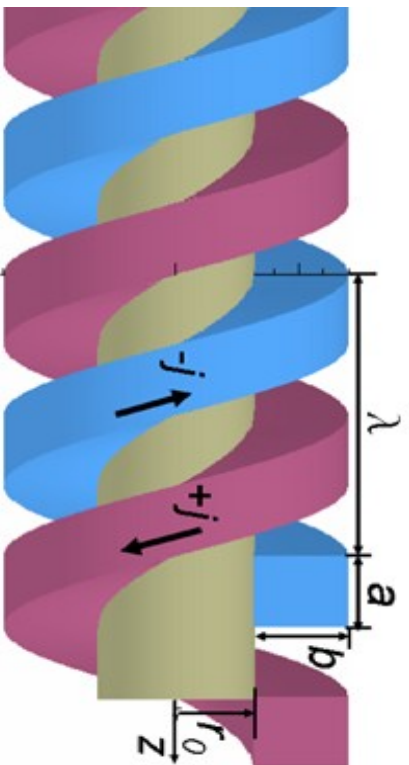


Helical Undulator Magnetic Field Optimization

Magnetic field vs conductor geometry



Previously was chosen

$a=5$ cm,

$b=5$ cm

and used corresponding current density to get 1.5 kG on-axis field.

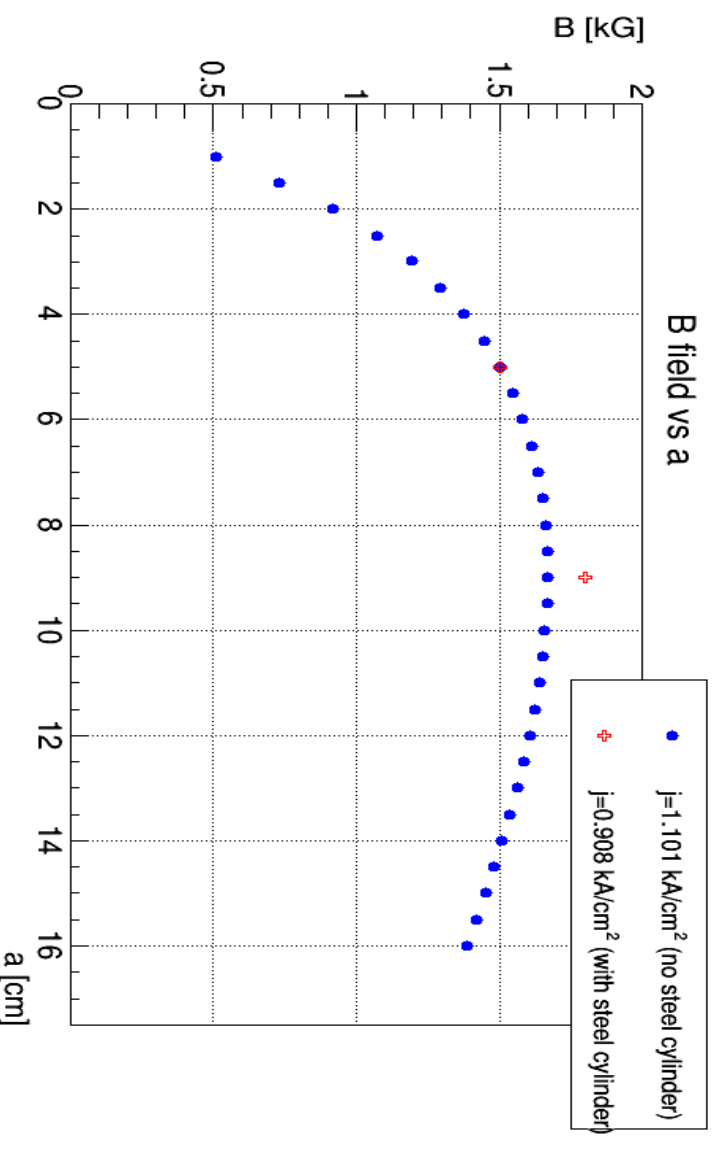
With

$a=9$ cm,

$b=2.8$ cm

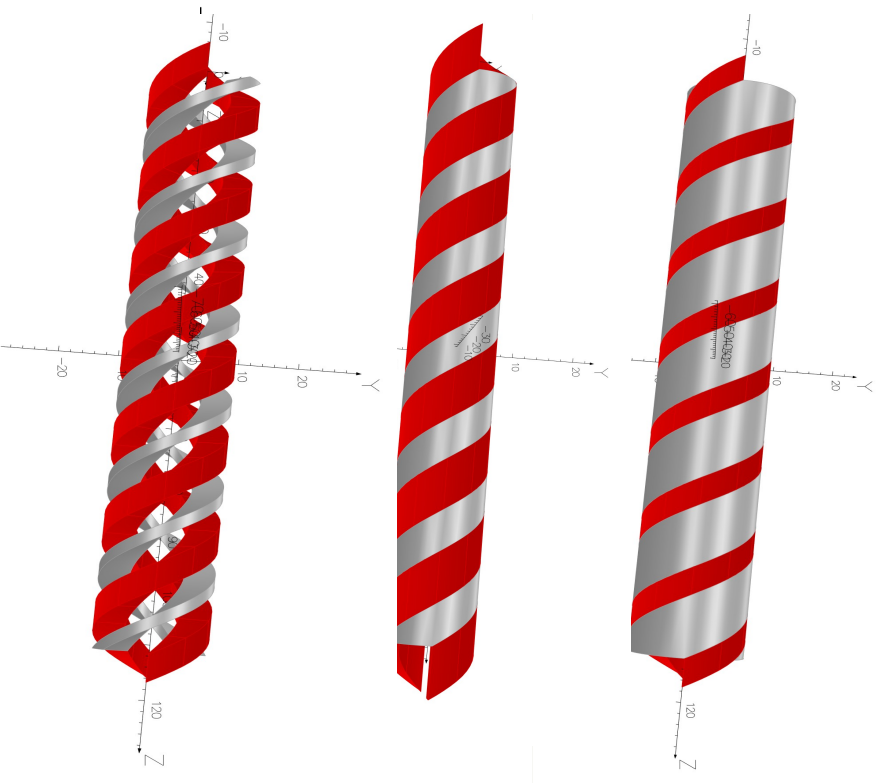
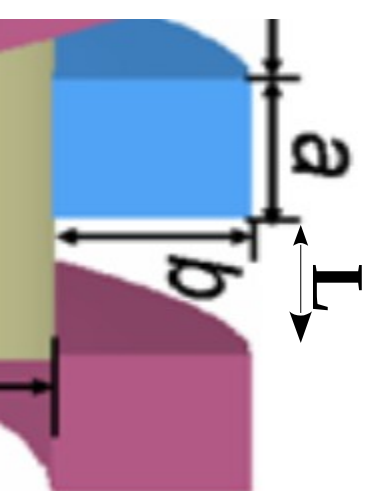
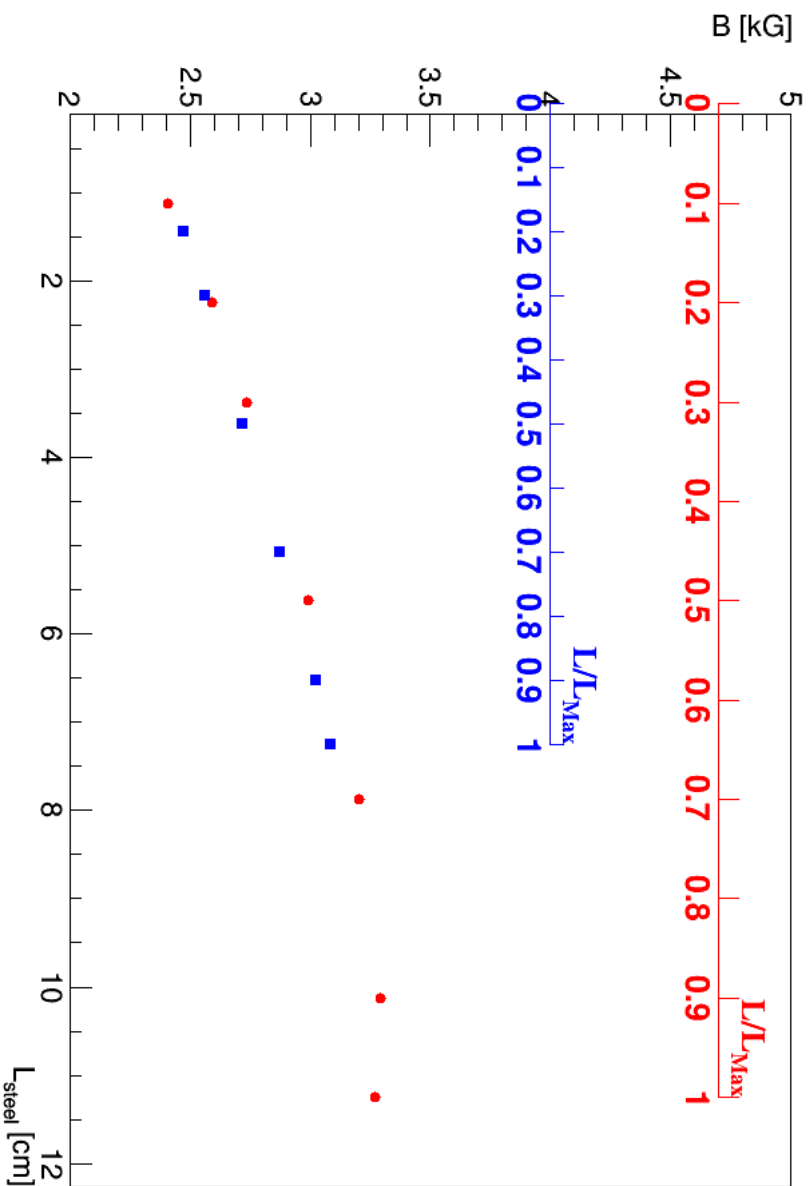
we get about 20% higher on-axis field

$b \times a = 25 \text{ cm}^2$, assuming the same number of conductors



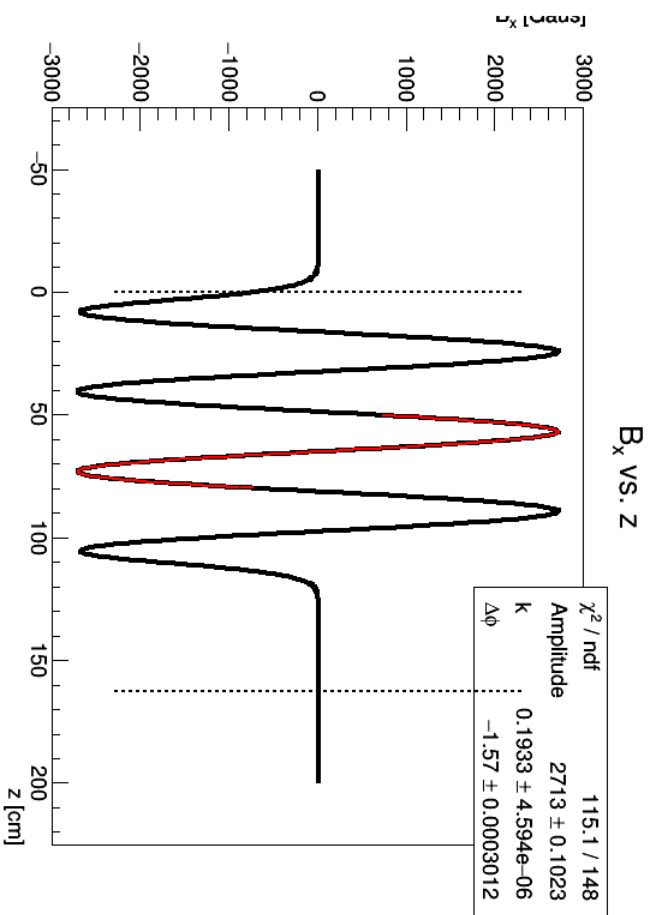
Magnetic field vs steel-spiral geometry

On-axis B field vs steel width (L)



Magnetic field profile

$$B_x(z) = \text{Amp} * \sin(kz + \Delta\phi)$$



$$B_y(z) = \text{Amp} * \cos(kz + \Delta\phi)$$

