

Wiggler Magnet Optimization for Linear Collider Damping Ring

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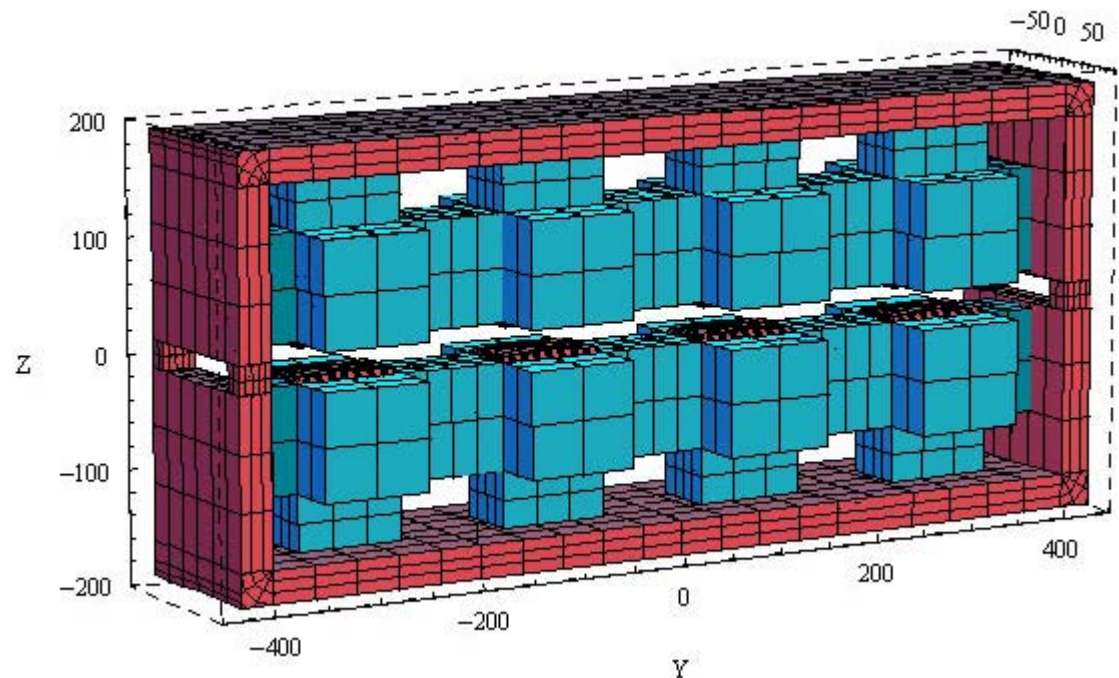
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Wiggler field optimization

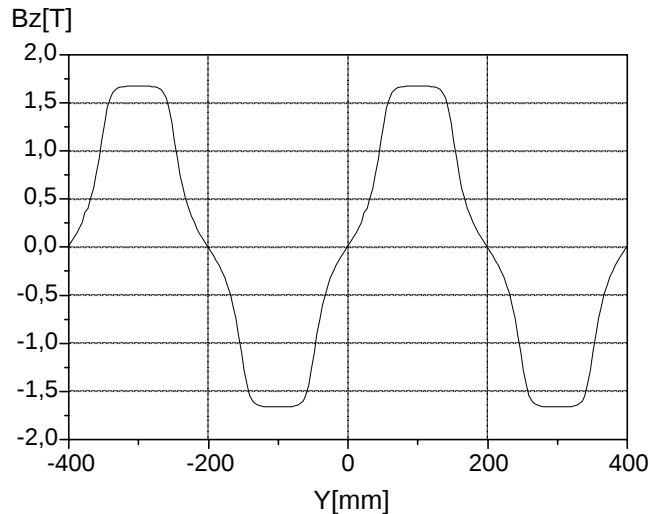
- The magnetic design of the wiggler proposed in the TESLA TDR has been optimized to increase the good field region.
- The pole width has been increased from 40 mm to 60 mm to increase magnetic field homogeneity at the expense of cost and weight.
- Wiggler field optimization has been achieved by means of slots, which are made symmetrically about the central axis along the length of a pole

Wiggler magnet for 2 periods displayed with dismantled iron yoke sides.

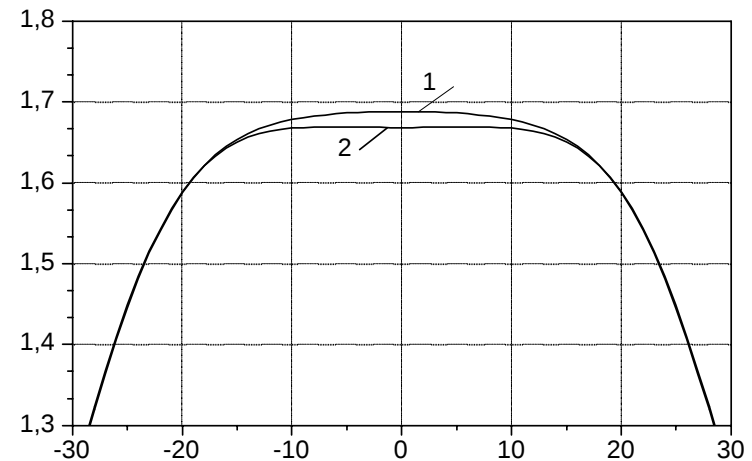
- period length = 400 mm
- gap 25 mm
- total length 5.26 m (12 periods + 2 half periods)



3D Field Calculation

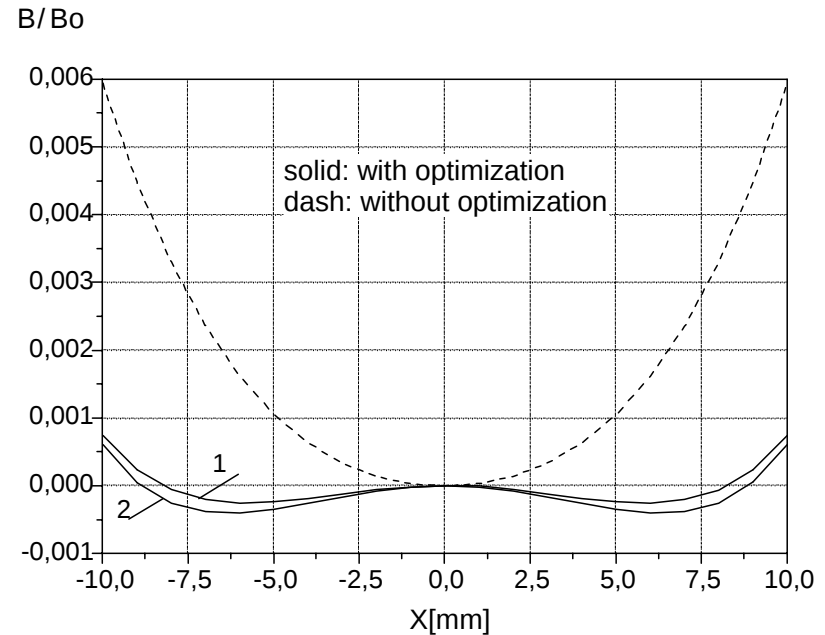
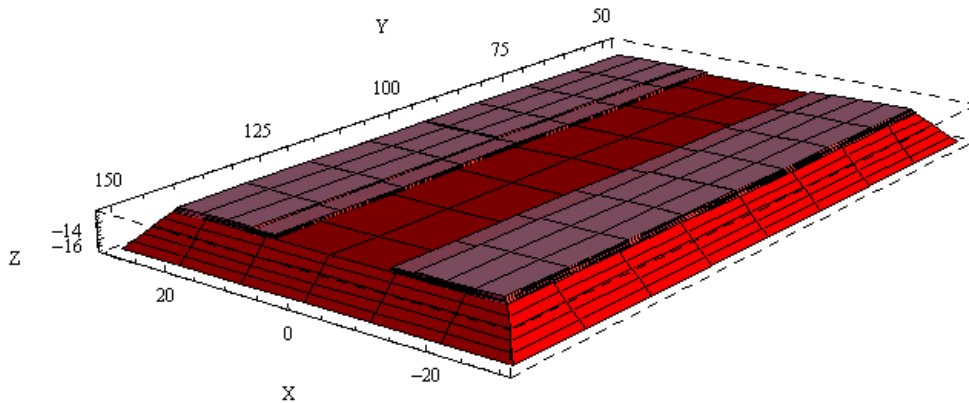


Vertical field along the
wiggler axis



Transverse field distribution $B_z(x)$ in the
orbit plane $Z = 0$ at the pole center:
1- without optimization,
2-with optimization

Relative change of magnetic field in transverse direction at the pole center



1- with three slots

2-with two slots

	B_0 (T)	DB/B_0 $x = \pm 10\text{mm}$	
No optimization	1.68	$5.9 \cdot 10^{-3}$	
With 2 slots	1.66	$6.1 \cdot 10^{-4}$	
With 3 slots	1.66	$7.5 \cdot 10^{-4}$	