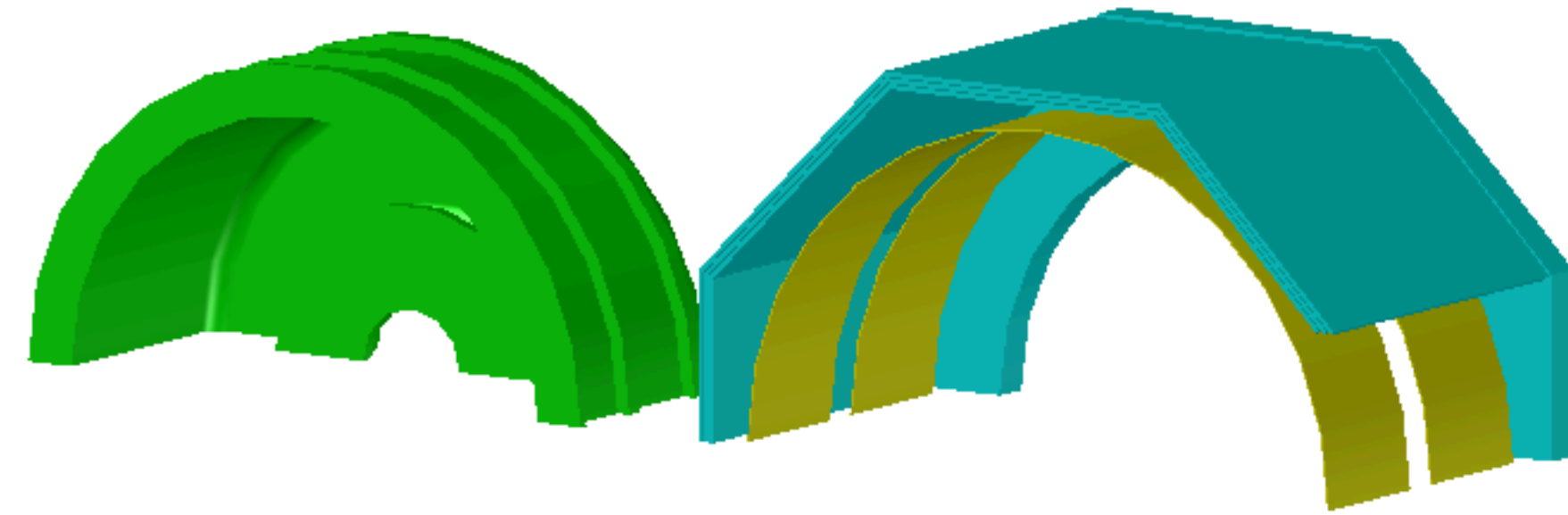


# SPY@DND new yoke

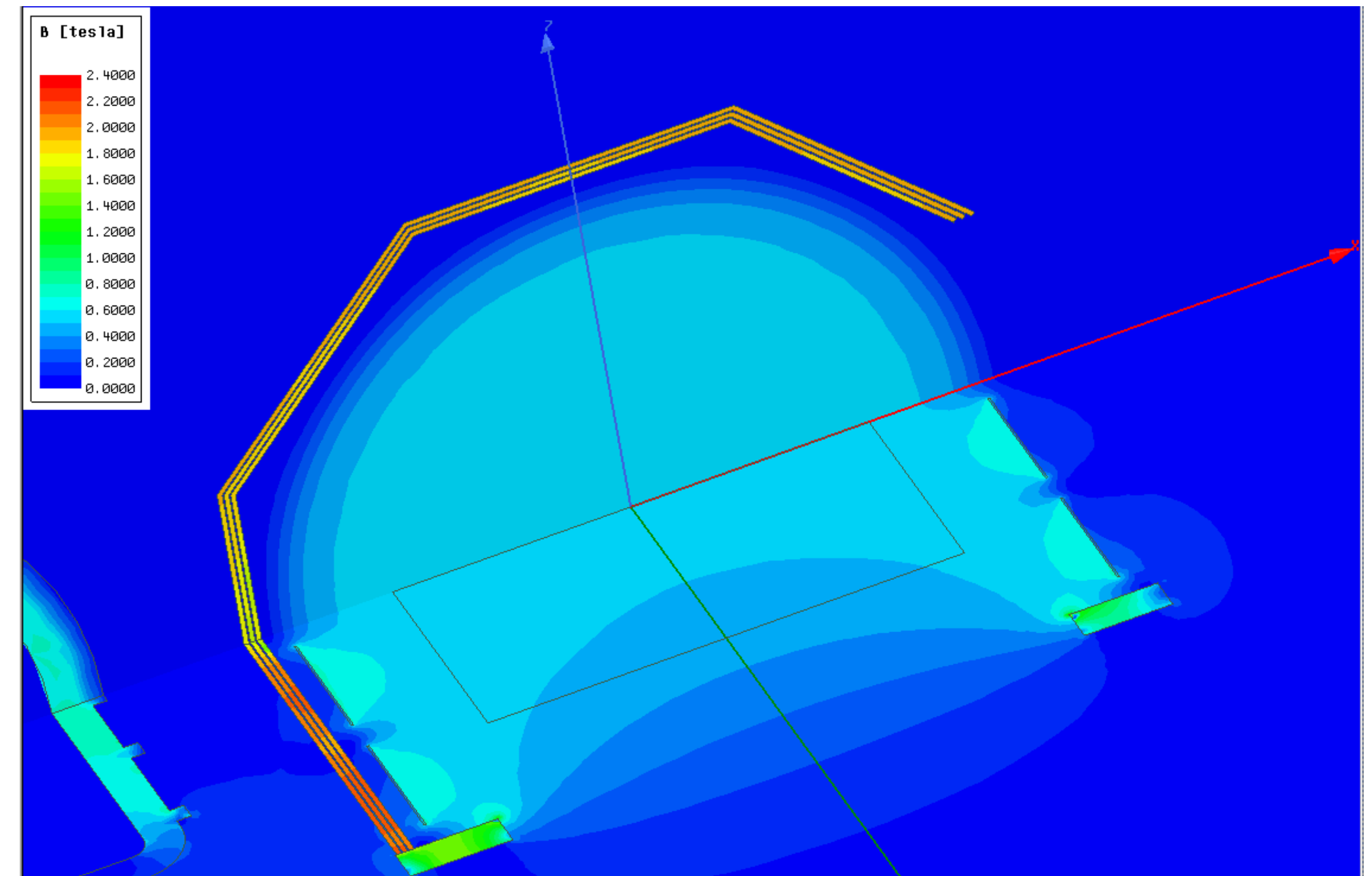
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Andrea Bersani

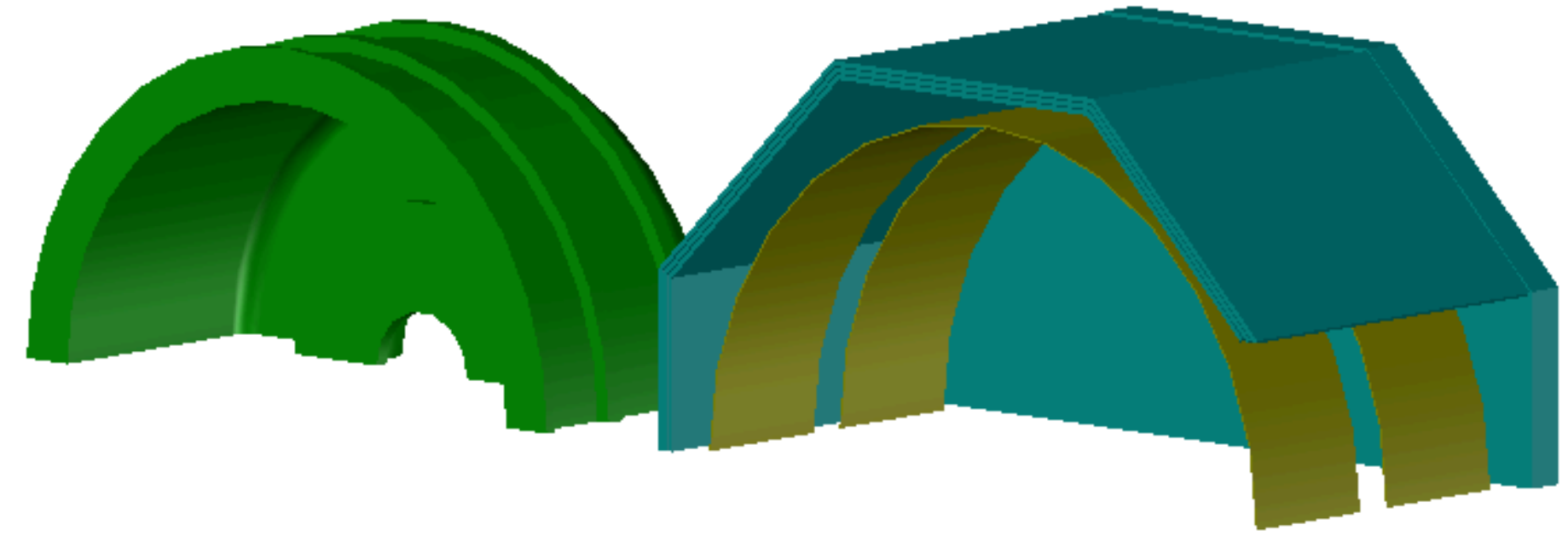
# Reference design: SPYDNDo6



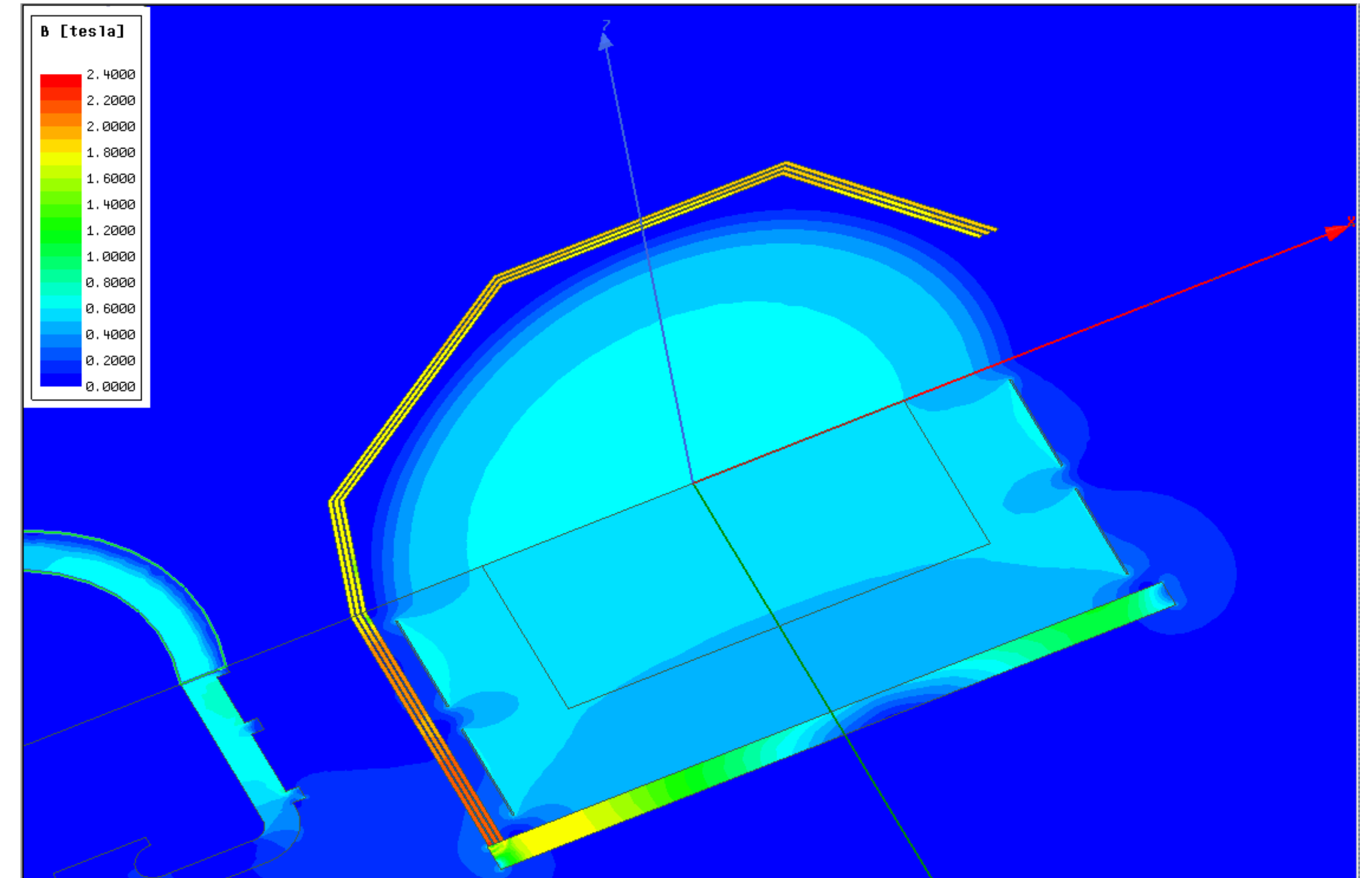
- ↪ Window only towards LArTPC
- ↪ "Thin" iron yoke
- ↪ Wide hole on end-caps



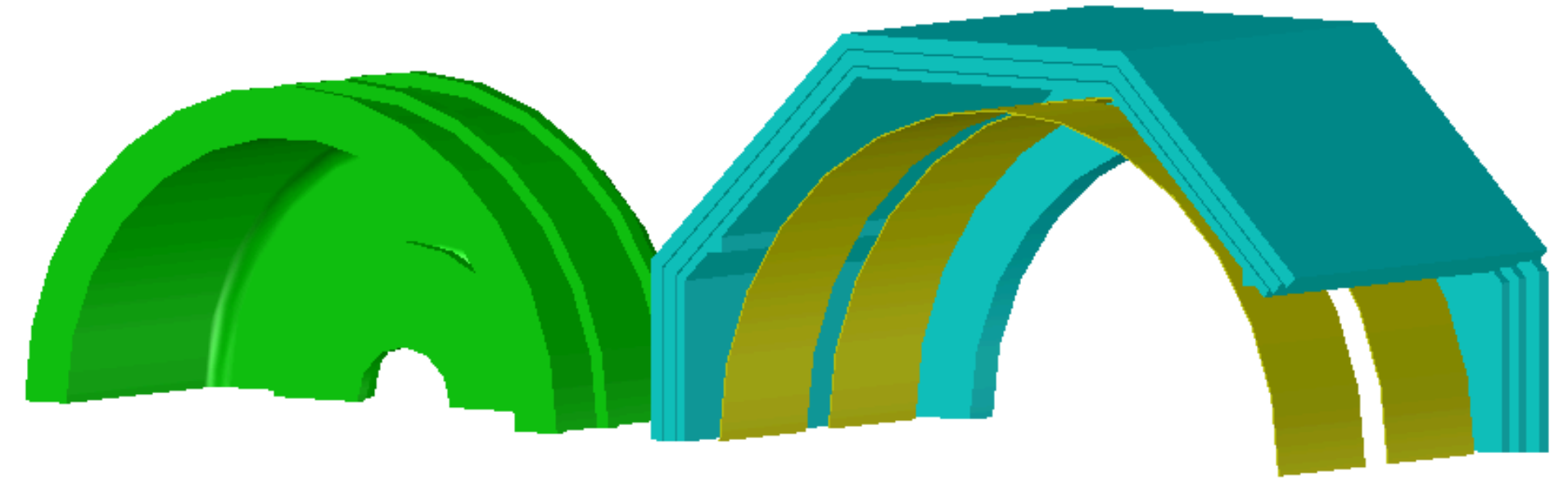
# Closed end-caps: SPYDND07



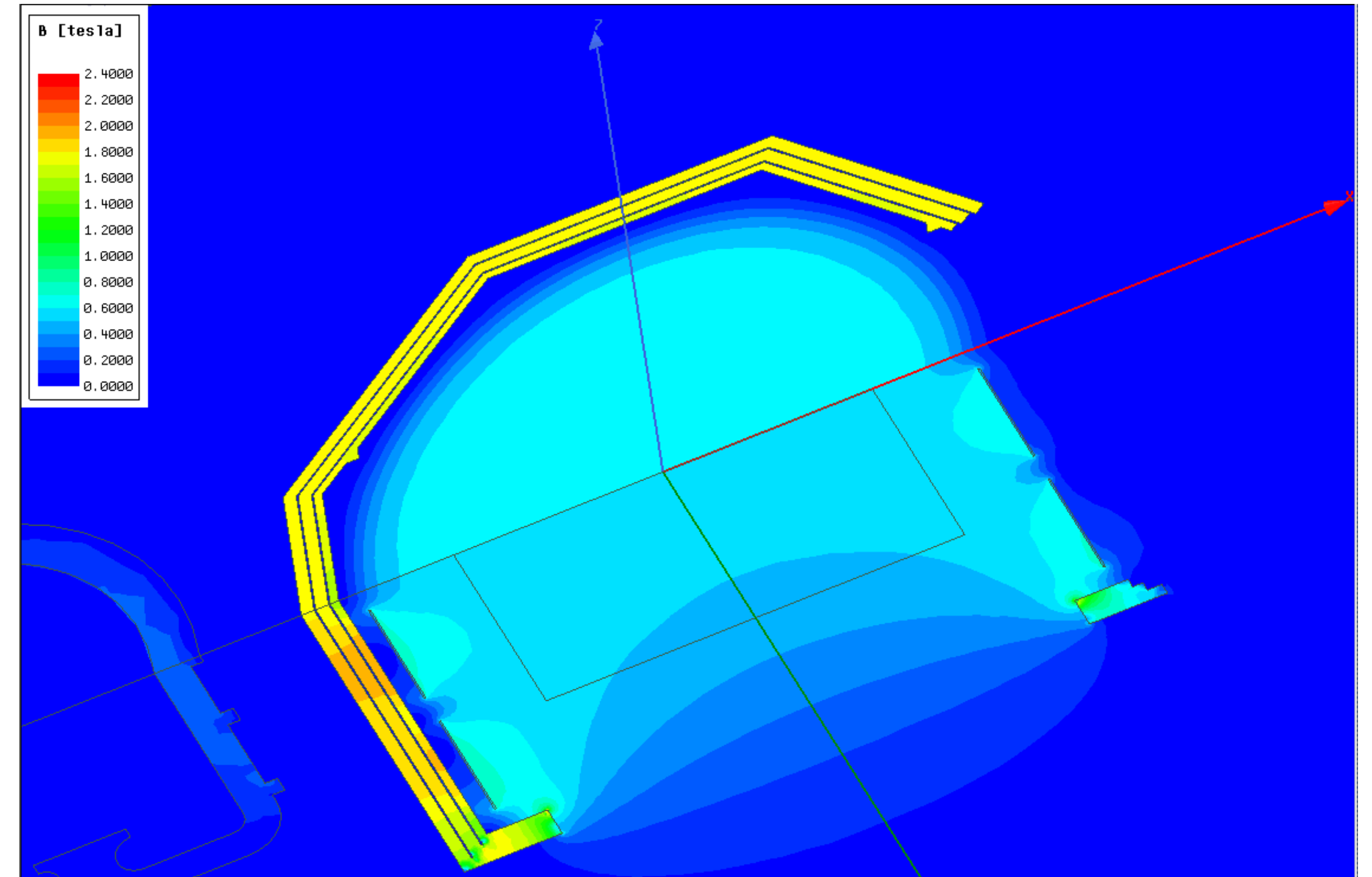
- ↪ Window only towards LArTPC
- ↪ "Thin" iron yoke
- ↪ No hole on end-caps



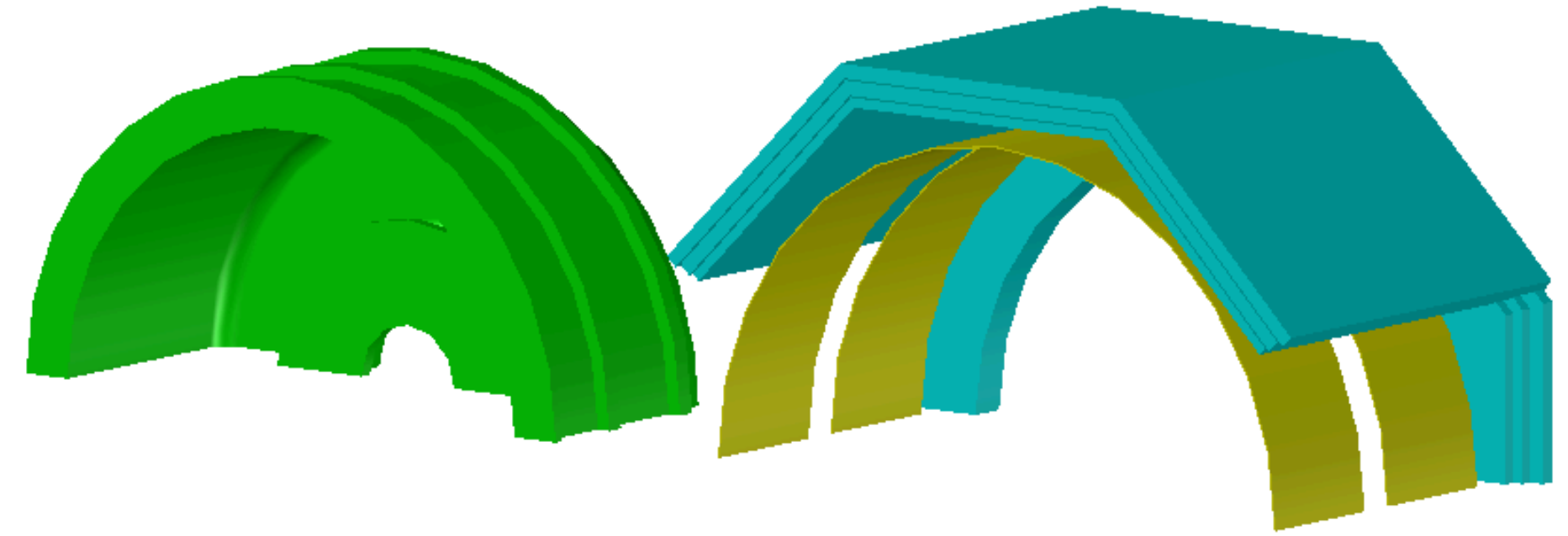
# Thick iron yoke: SPYDND08



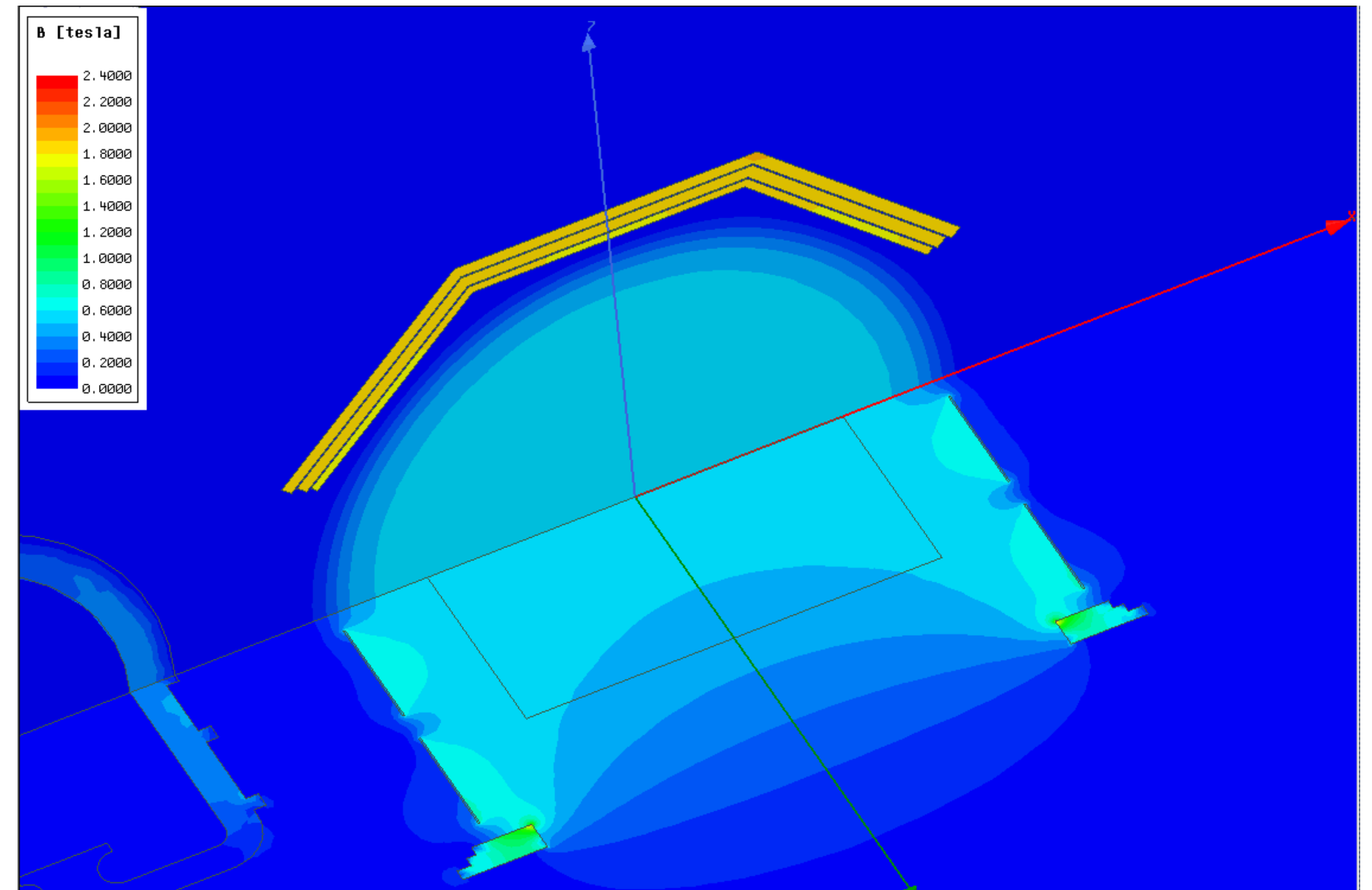
- ↪ Window only towards LArTPC
- ↪ "Thick" iron yoke
- ↪ Wide hole on end-caps



# Thick yoke, two windows: SPYDNDog

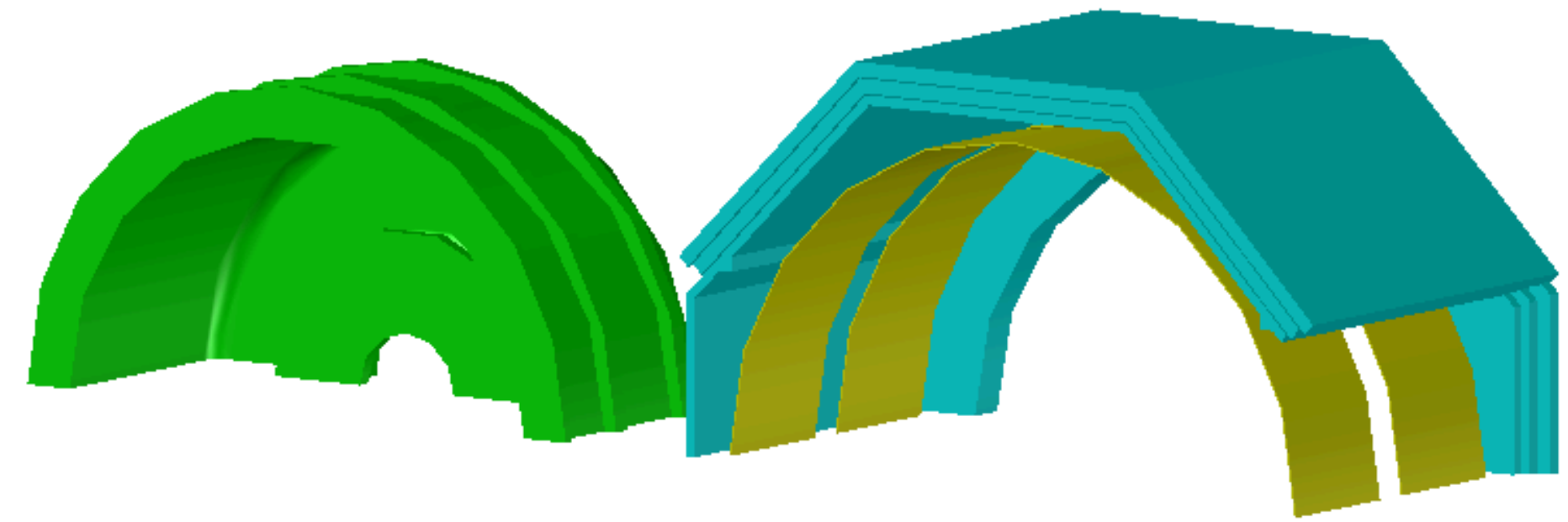


- ↪ Window towards LArTPC
- ↪ Window towards SAND
- ↪ "Thick" iron yoke
- ↪ Wide hole on end-caps

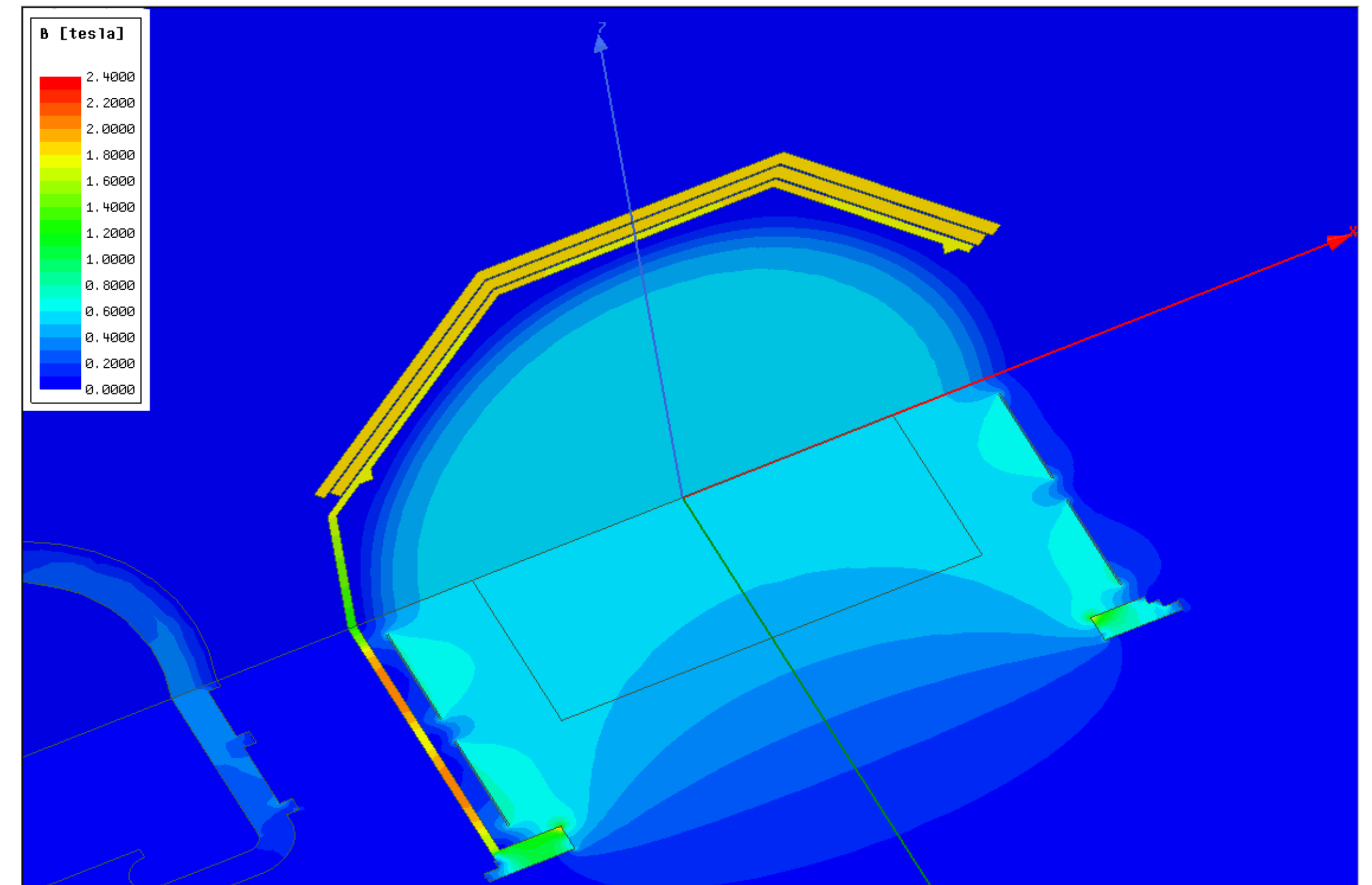




# Thick/thin yoke: SPYDND10



- ↪ Window towards LArTPC
- ↪ Thin yoke towards SAND
- ↪ Thick iron yoke elsewhere
- ↪ Wide hole on end-caps



# Parameters comparison

	SPYDND06	SPYDND07	SPYDND08	SYDND09	SPYDND10
<b>Bmin on TPC</b>	0.4454 T	0.4981 T	0.4580 T	0.4499 T	0.4522
<b>Bmax on TPC</b>	0.5588 T	0.5238 T	0.5781 T	0.5614 T	0.5675
<b>Force along beam</b>	160 kN	100 kN	460 kN	60 kN	260 kN
<b>Force along axis</b>	2.15 MN	0.95 MN	2.15 MN	2.1 MN	2.1 MN
<b>Current per coil</b>	1.05 MA	0.95 MA	1 MA	1 MA	1 MA
<b>Stored energy</b>	46.6 MJ	41 MJ	46 MJ	45 MJ	45.5 MJ
<b>Force on SAND</b>	120 kN	104 kN	12 kN	32 kN	24 kN

- ↪ Force along beam: force felt by the 4 coils pointing towards SAND
- ↪ Force along axis: force felt by 2 coils pointing towards the other 2 coils
- ↪ Force on SAND: force felt by SAND yoke, generated by stray field

# Comments

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- ↪ A thicker iron yoke has several advantages
  - ↪ better exploitation of the current
  - ↪ smaller stray field (magnetic force down to 10% w.r.t. the reference design)
- ↪ Closed end-caps should be investigated (at least partially closed)
- ↪ Symmetric windows give a good reduction of stray field and a decrease of radial force