# Two-Layer Cos$\theta$ (*TLC*) for the FCC


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Wednesday August 30th, 2017
09:45 – 10:15

**MT25**

See full talk this afternoon MT25-Wed-Af-Or23-06, Auditorium, 16:15
Trey Holik, Giorgio Ambrosio, Giorgio Apollinari

**25th International Conference on Magnet Technology**

**RAI - Amsterdam**
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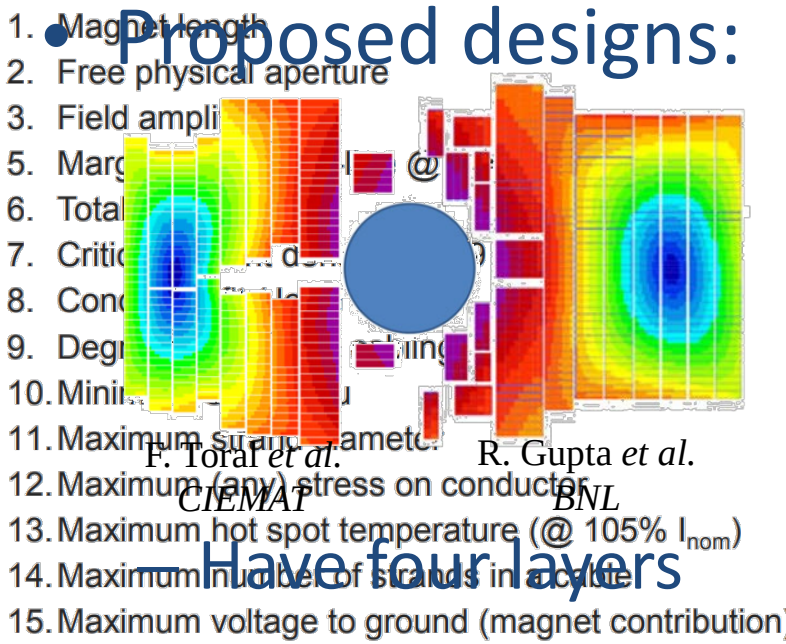
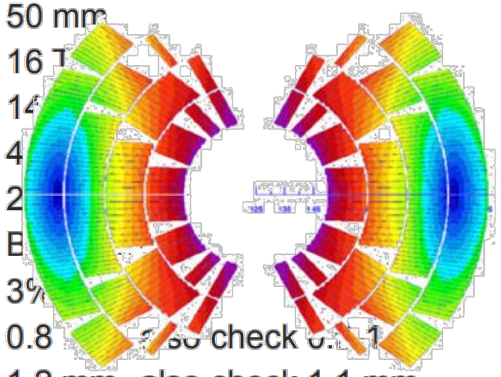
# What's the Goal?

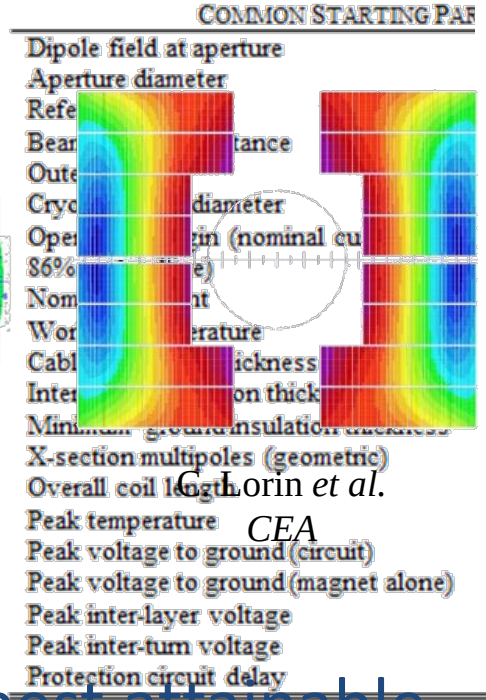
- Future Circular Collider: 16 T (Tevatron: 4 T, LHC: 8 T) **-> $Nb_3Sn$**
- Standardized Design Specifications: EuroCirCol Tommasini *et al.*
  - Bore size, Peak stress, Quench criteria, Cond. prop., etc.
- Proposed designs:
  - Have four layers
  - Use projected $J_c$ values 16% above best attainable




F. Toral *et al.* *CIEMAT*

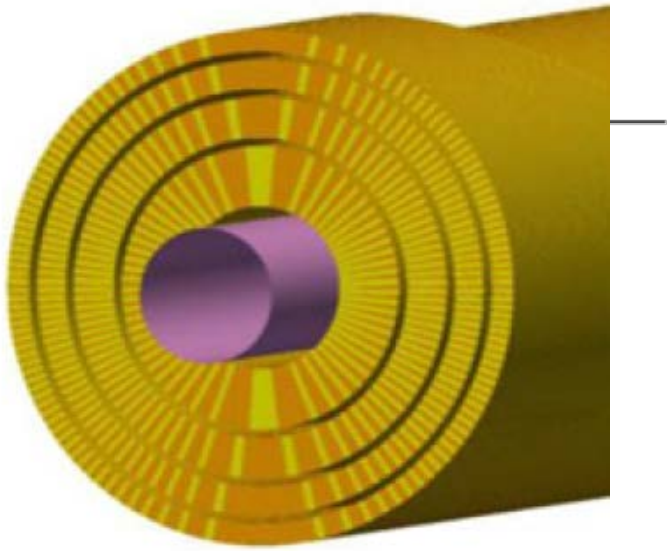



R. Gupta *et al.* *BNL*




M. Sorbi *et al.* *INFN*

C. Lorin *et al.* *CEA*

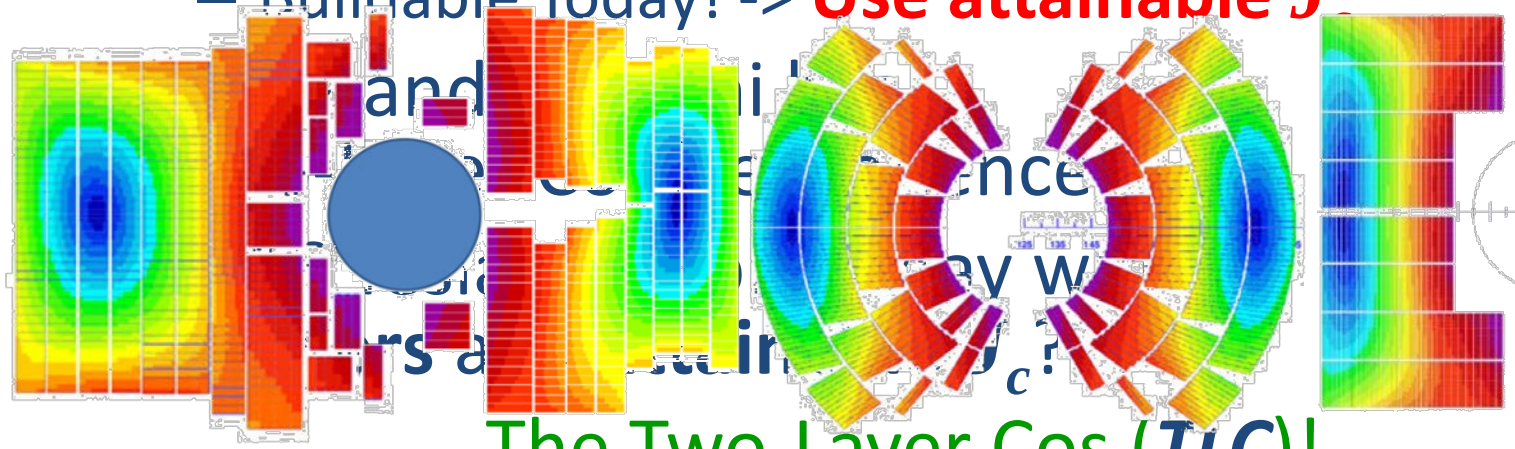


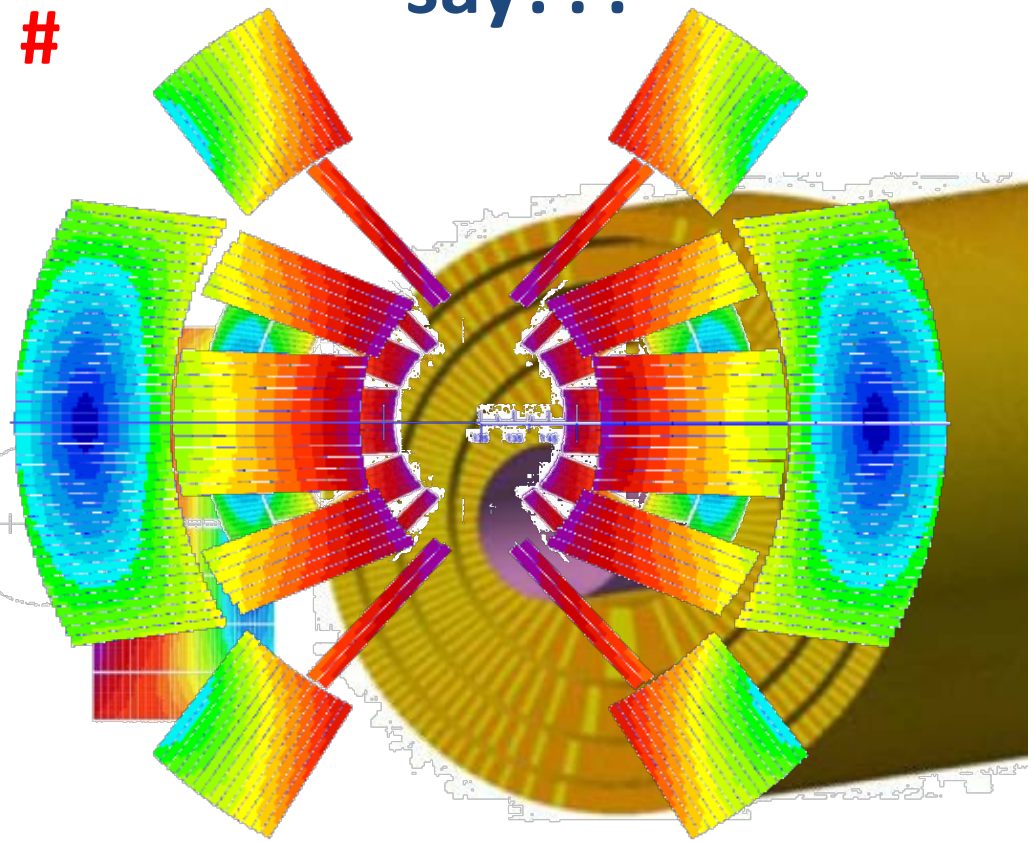
S. Caspi *et al.*, *LBNL*
B. Auchmann *et al.*, *PSI*

# Obtaining 16 Tesla

- What's desired???
  - Efficient Conductor Use -> **Cos$\theta$**
  - Less complication, fewer parts -> **Minimize # blocks**
  - Reduce Coil Fabrication -> **Two Layers**
  - Buildable Today! -> **Use attainable $J_c$**

**What do the numbers say???**





The Two-Layer Cos (***TLC***)!

# The *TLC* Offers Simplicity and Meets Requirements

- Conductor geometry and copper ratio **well within spec.**
- Field Quality **within spec**.
- Quench T **within spec.**
- Peak Stress **within spec.**
- Current (27.8 kA) **Unavoidable…**
- Is it currently BUILDABLE???
  - **YES**, with some challenges but…

    …Hi-Lumi is building experience and opportunity awaits!
- See Wed-Af-Or23-06!!! (This room, 16:15)