

TESLA DETECTOR MAGNET DESIGN FOR THE TDR

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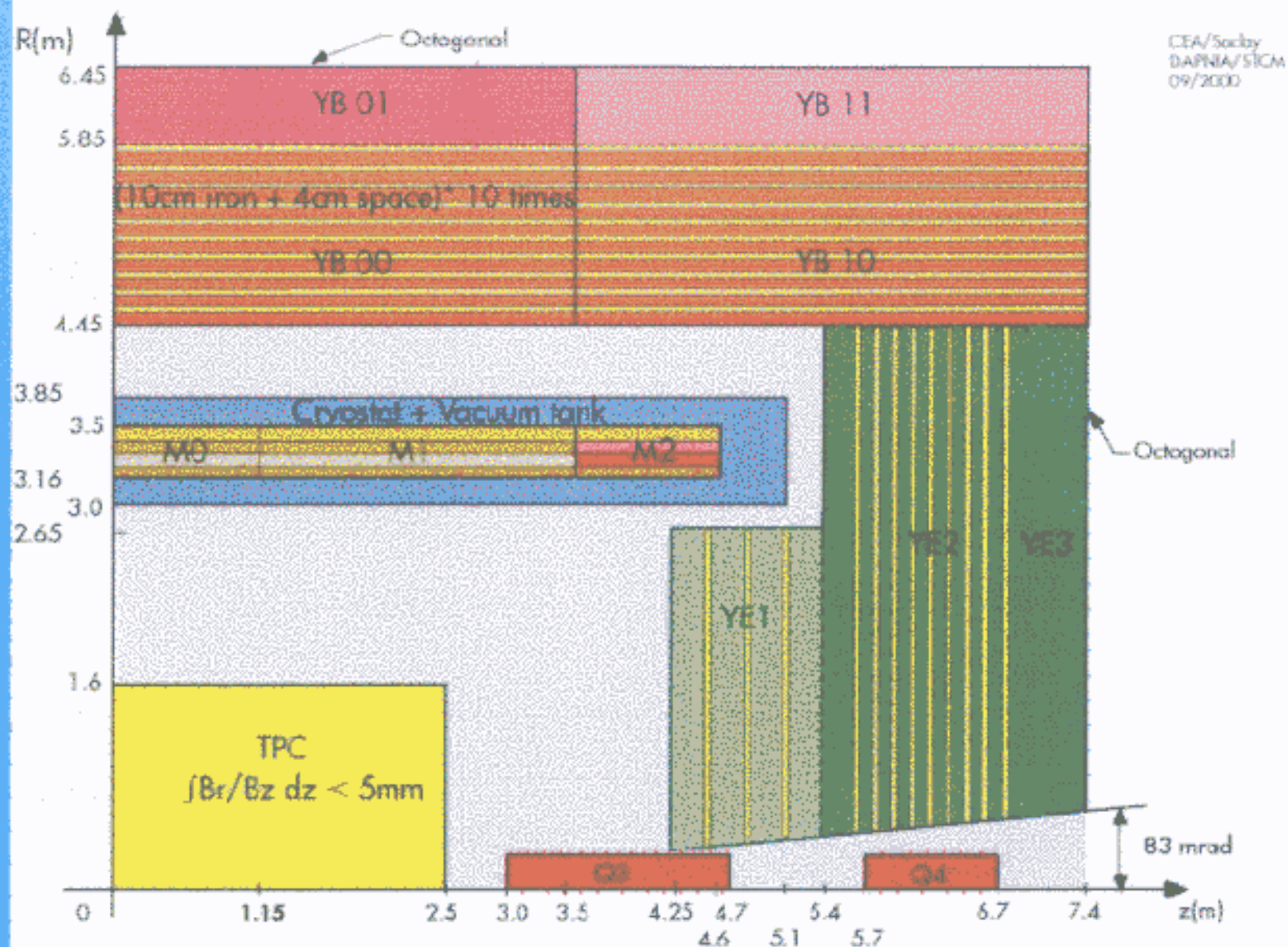
1- INTRODUCTION

- 1 - Final work done on the solenoidal magnet for the TDR.**
- 2 - All the requirements from physics are fulfilled**
- 3 - The draft of the chapter « Magnet » for the TDR is now ready**

2 - CHANGES IN THE MAGNET DESIGN **SINCE JULY MEETING AT CERN**

- Long barrel yoke.
- Barrel yoke in 3 pieces (3.9 m + 7.0 m + 3.9 m).
- Octagonal shape for barrel and end cap yokes.
- Splitted pole tip (3 gaps, 7 mm wide each).
- Optimization of pole tip profile.
- Calculations by B. Gastineau (CEA/Saclay) and S. Klioukhine (now at FNAL).

3 - DESIGN FOR TDR



Main characteristics of TESLA Detector Magnet (1)

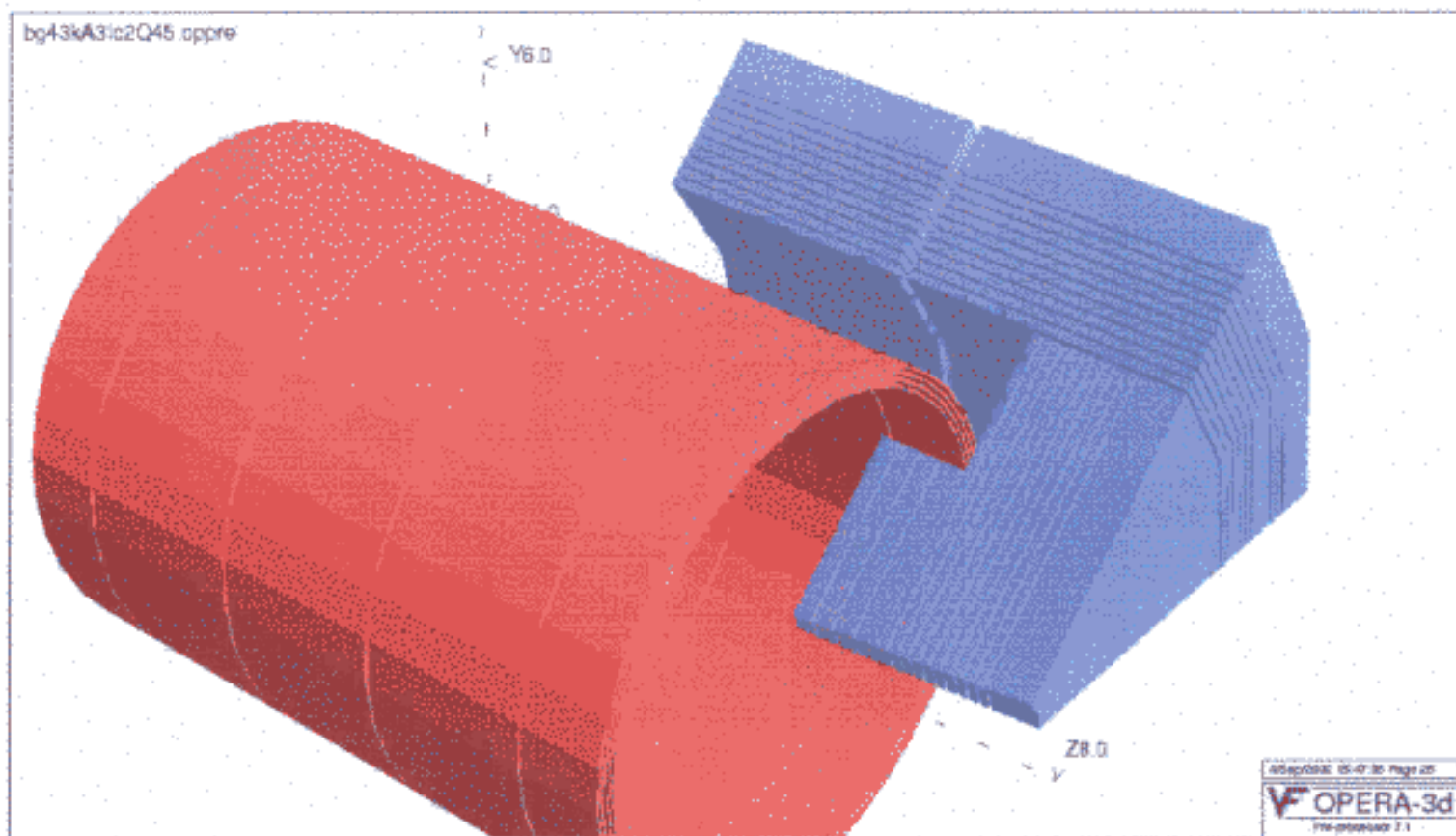
Dimensions	
Cryostat inner radius (m)	3
Coil inner radius (m)	3.16
Coil outer radius (m)	3.50
Cryostat outer radius (m)	3.85
Barrel yoke inner radius (m)	4.45
Barrel yoke outer radius (m)	6.45
Coil length (m)	9.2
Cryostat length (m)	10.2
Yoke overall length (m)	14.8

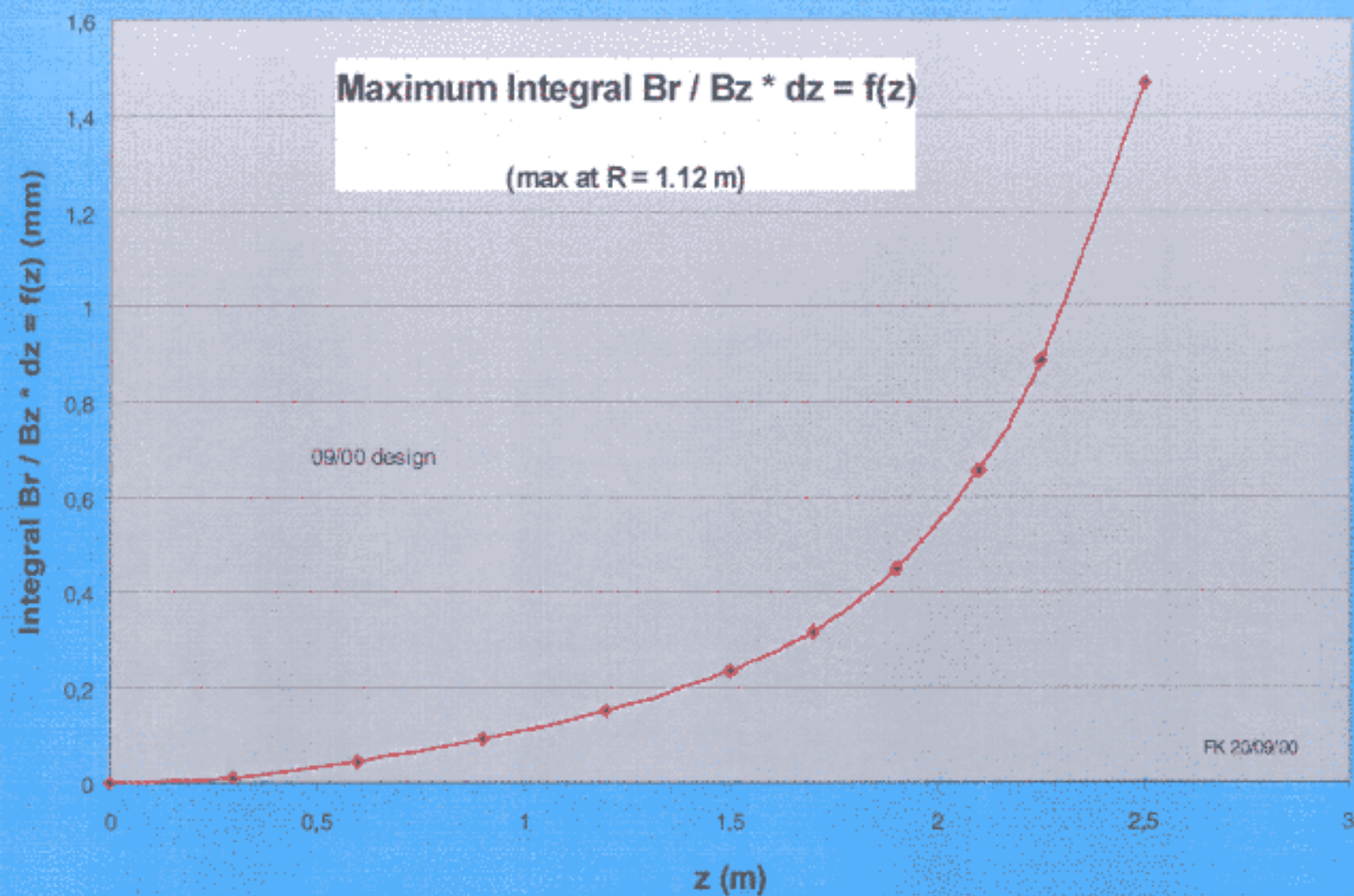
Main characteristics of TESLA Detector Magnet (2)

Magnetic field	
Central field (T)	4.0
Maximum field on conductor (T)	4.70
Stored energy (GJ)	2.3
Nominal main current (A)	18 800
Nominal correction current (A)	24 500
Ampere-turns main coil (At)	$29.8 \cdot 10^6$
Ampere-turns correction coils (At)	$4.7 \cdot 10^6$

Main characteristics of TESLA Detector Magnet (3)

Weight	
Cold mass (t)	200
Barrel yoke (t)	6 400
End cap yoke (t)	2 000
Total magnet (t)	8 600





4 - ASSEMBLY SCENARIO

- **Magnet (coil + yoke) assembly scenario defined.**
- **HCAL supported inside the vacuum tank through two rails**
- **ECAL installation inside the HCAL still in discussion**

5 - TDR LAYOUT (1)

- General introduction

- . Small versus large detector (i.e. thin versus thick coil)**
- . Magnetic field (3 vs 4T)**

⇒ to be written

- Technical part

- . As presented at last CERN meeting, with some sentences about field mapping**

5 - LAYOUT FOR TDR (2)

- Estimates

- . Cost : 65 M Euros**
- . Manpower from laboratories : 200 man.year over 6 years**
- . Planning : six years from green light to final test**

CONCLUSIONS

- **Magnetic design frozen.**
- **Requests from physics fulfilled.**
- **Draft for the TDR concerning the magnet now available.**