HL-LHC High Order Correctors

Marco Statera
on behalf of the LASA magnet team
INFN Milano - LASA

Milano – 12 Luglio 2022

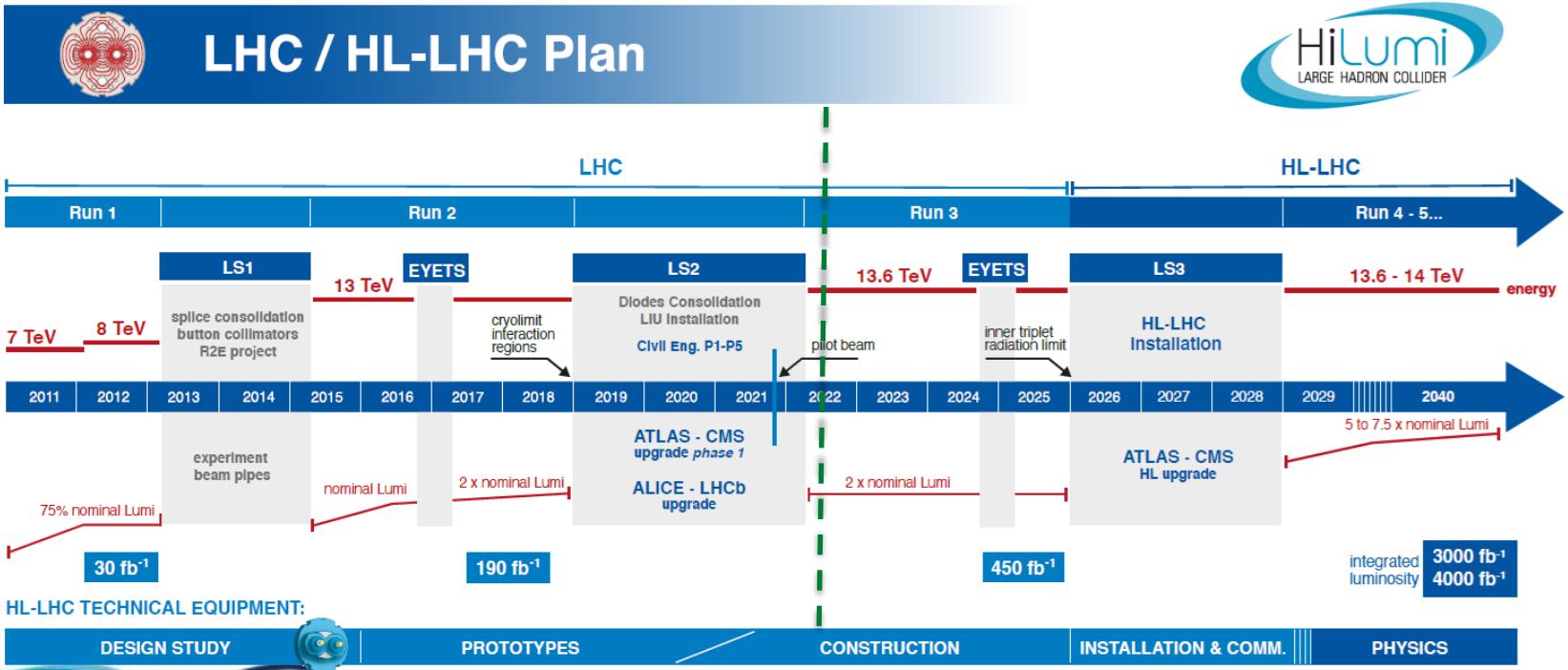
Outline

- Scope: HL-KLHC and the High Order correctors magnets
- Series production status
- Schedule
- Richieste

HL-LHC

The main objective of HiLumi LHC Design Study is to determine a hardware configuration and a set of beam parameters that will allow the LHC to reach the following targets: A peak luminosity of L_{peak} = **5×10^{34} cm^{-2}s^{-1} with levelling**, allowing: An integrated luminosity of **250 fb^{-1} per year**, enabling the goal of **L_{int} = 3000 fb^{-1}** twelve years after the upgrade. This luminosity is more than ten times the luminosity reach of the first 10 years of the LHC lifetime.

Courtesy of L. Rossi



HiLumi HL-LHC PROJECT

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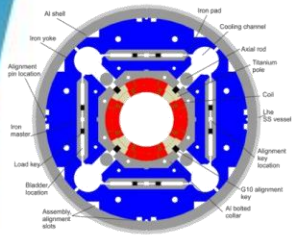
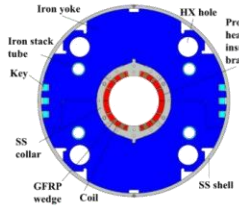
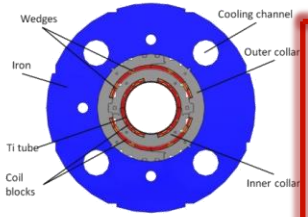
HO Corrector Magnets Zoo



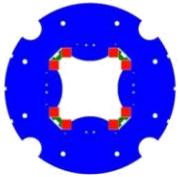
Triplet [G. Ambrosio, P. Ferracin et al.]



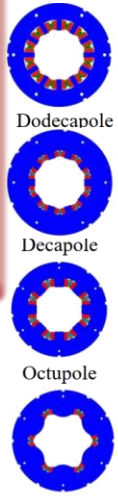
D1 [T. Nakamoto, et al.]



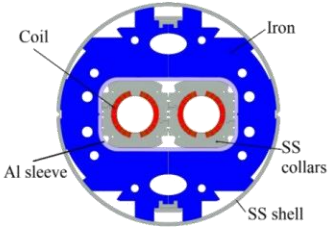
MCBXF [F. Toral, et al.]



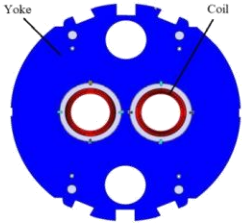
Skew quad



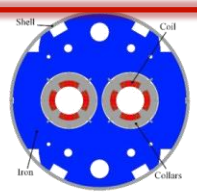
[M. Sorbi, M. Statera, et al.]



D2 [P. Fabbricatore, S. Farinon, et al.]



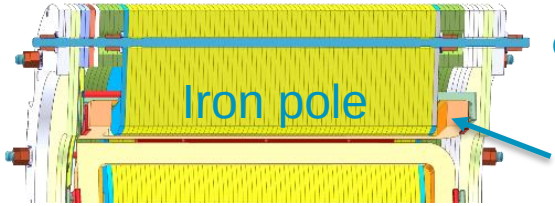
D2 correctors [G. Kirby, O. Xu, et al.]



MQYY [H. Felice, et al.]

Design, Construction & Test

- 5 prototypes
- 54 series magnets KE3085 **in kind contribution**

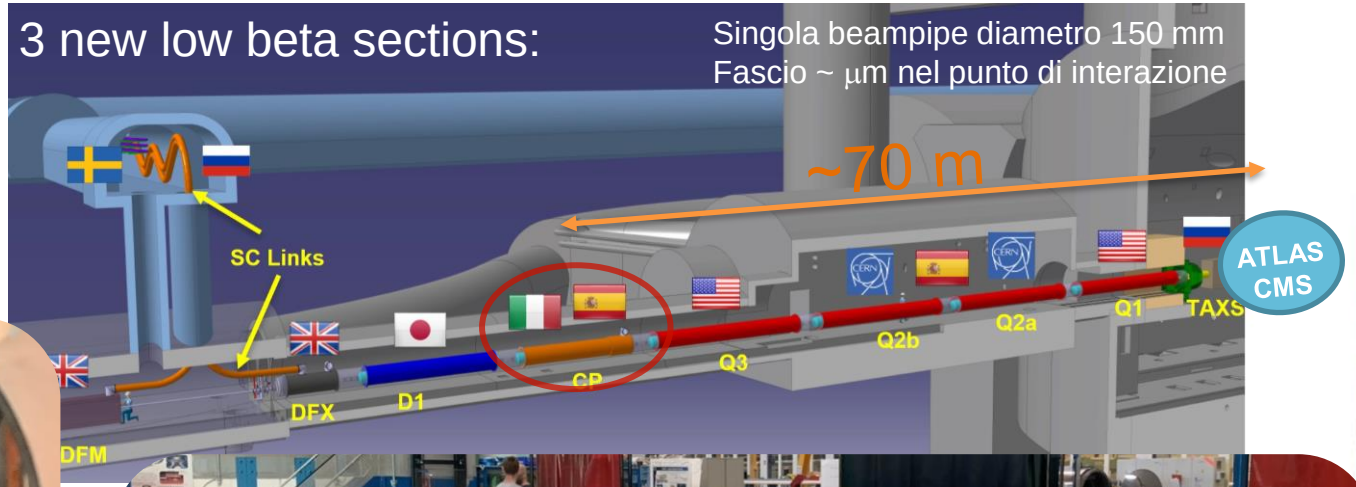


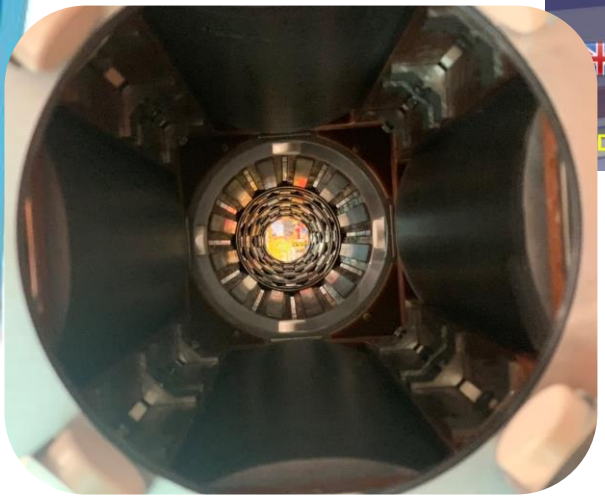
NbTi SuperFerric design
Geometrical lengths:
200 mm - 265 mm
12P, S4P: 540 mm – 580 mm
Outer diam. 320 mm – 460 mm
Inner bore ϕ 150 mm

THE LOW BETA SECTION

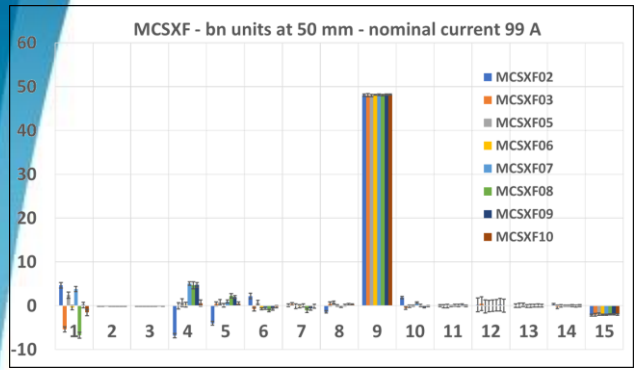
3 new low beta sections:

Singola beampipe diametro 150 mm
Fascio ~ μm nel punto di interazione





Selected Results



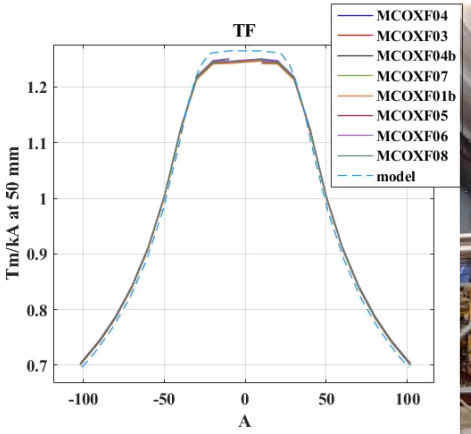
Test @LASA

Training

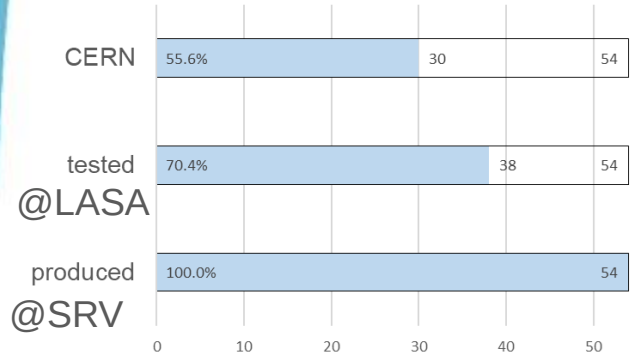
Quench memory after thermal cycle

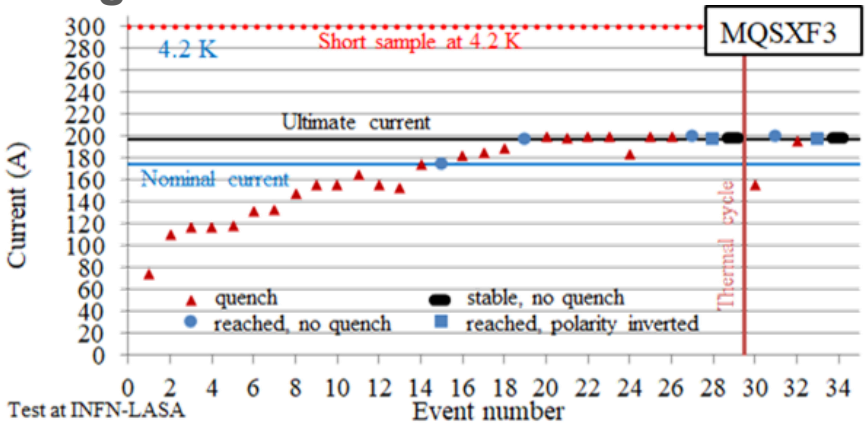
Field quality

Transfer function integrated field/current



Nell'ultimo anno testati 21 magneti al LASA





HL_SHOC

HL-LHC High Order Correctors
Consegna al CERN 2022
Prolungamento accordo fino all'installazione nel tunnel

FTE HL_shoc
Marco Statera (PT) 10%
Ernesto De Matteis (AR) 10%

Tecnici
Danilo Pedrini 10%
Arsenio Palmisano (TD) 30%
Antonio Paccalini 10%
Alessandro Pasini 20%

RICHIESTE HL_shoc

Fondi –

1 mese uomo di officina per lavorazioni meccaniche per aggiustaggi durante gli assemblaggi dei discendenti criogenici e movimentazione con muletto e carro ponte per trasporti.

INFN LASA

Istituto Nazionale di Fisica Nucleare

Laboratorio Acceleratori e Superconduttività Applicata

THANK YOU

LASA team

F. Broggi, E. De Matteis, S. Mariotto, A. Paccalini, A. Palmisano, A. Pasini, D. Pedrini, A. Leone, M. Quadrio, M. Prioli, M. Sorbi, S. Sorti, M. Statera, M. Todero

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