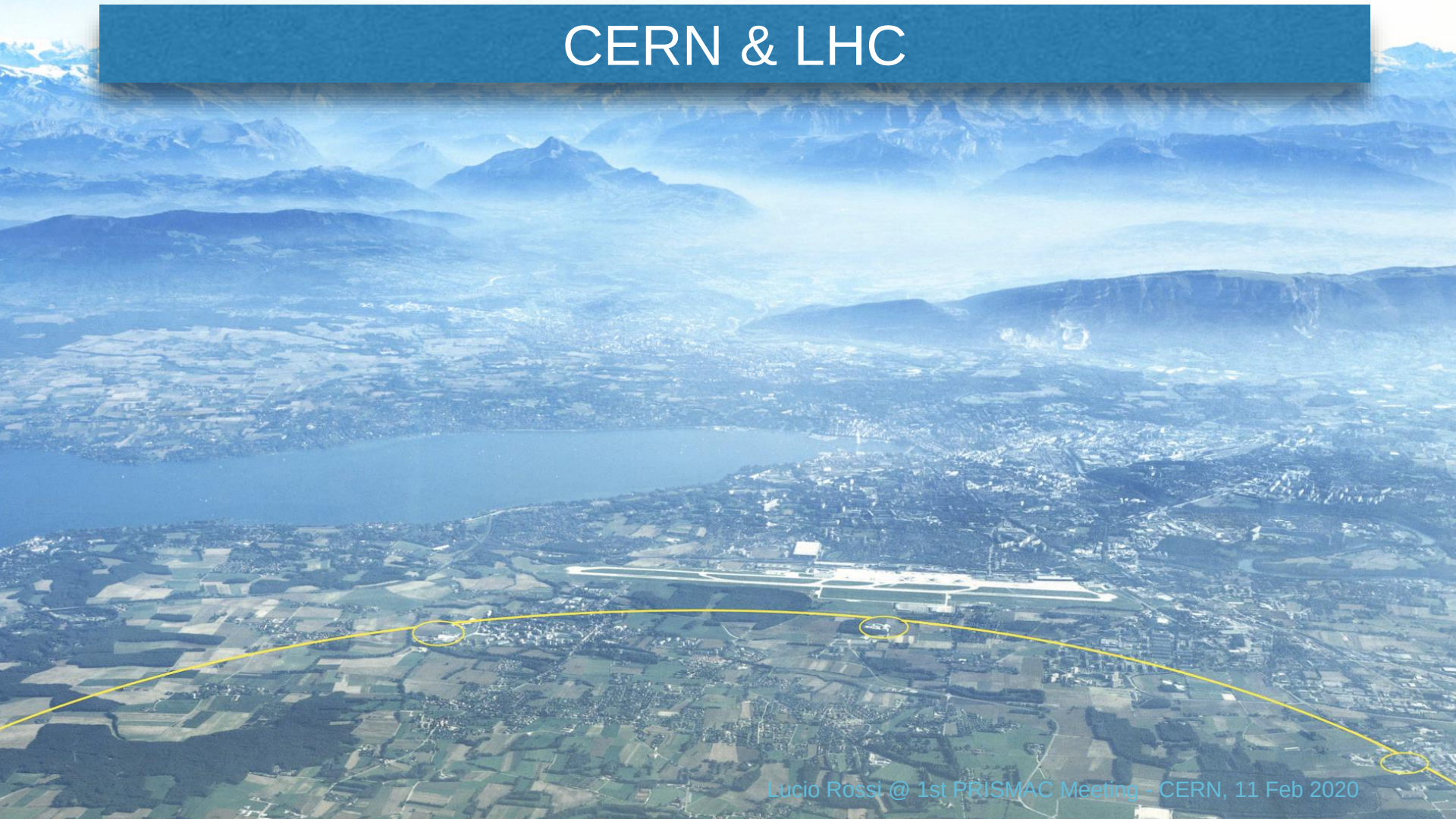
Scope of collaboration
CDTI – CERN – CIEMAT Meeting #1

Lucio Rossi

HL-LHC Project Leader

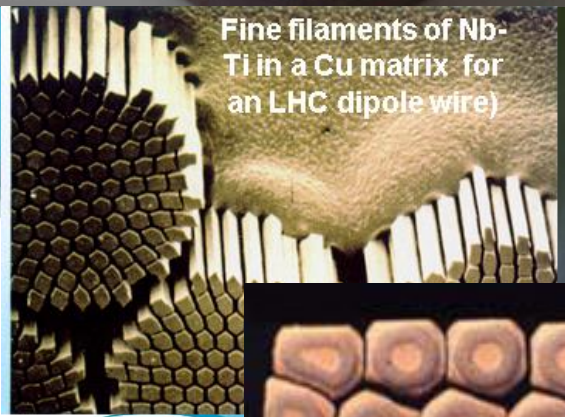
CERN, 13 February 2020

CERN & LHC

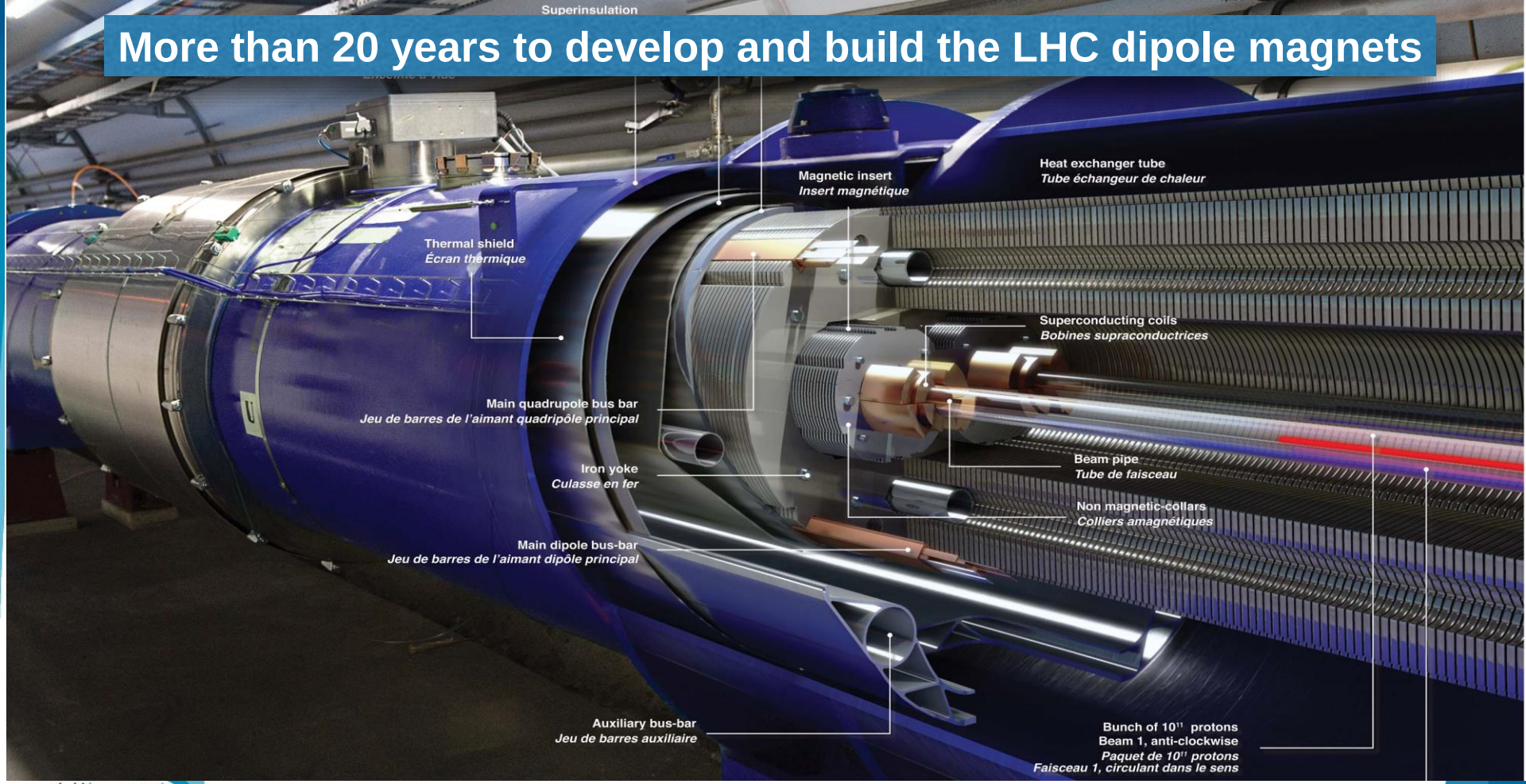


Very complex architecture
Thousands of fine Nb-Ti filaments well separated along km of wires

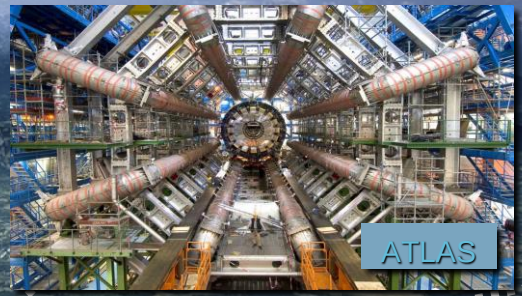
Cable of 15 kA!)

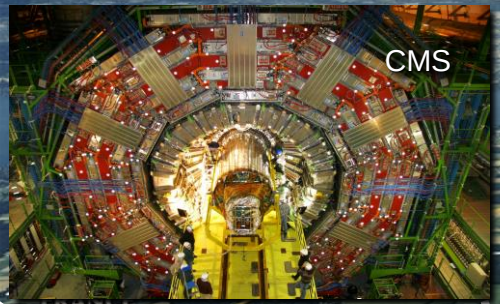


More than 20 years to develop and build the LHC dipole magnets

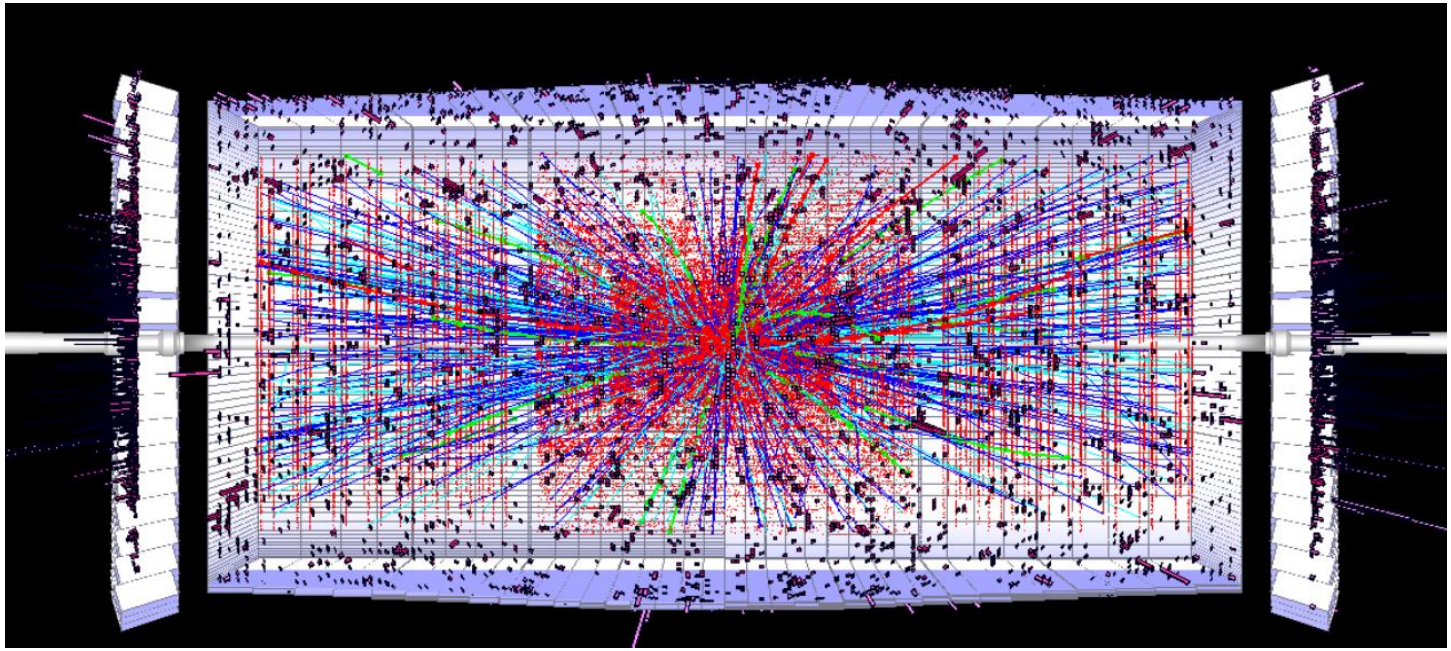


LHC the supermicroscope with its big four eyes





High Luminosity: a bright future for the LHC
Generate more light → machine upgrade
Better eyes to profit of higher luminosity → detector upgrade



Goal of HL-LHC

From EC-FP7 HiLumi LHC Design Study application of 2010

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:

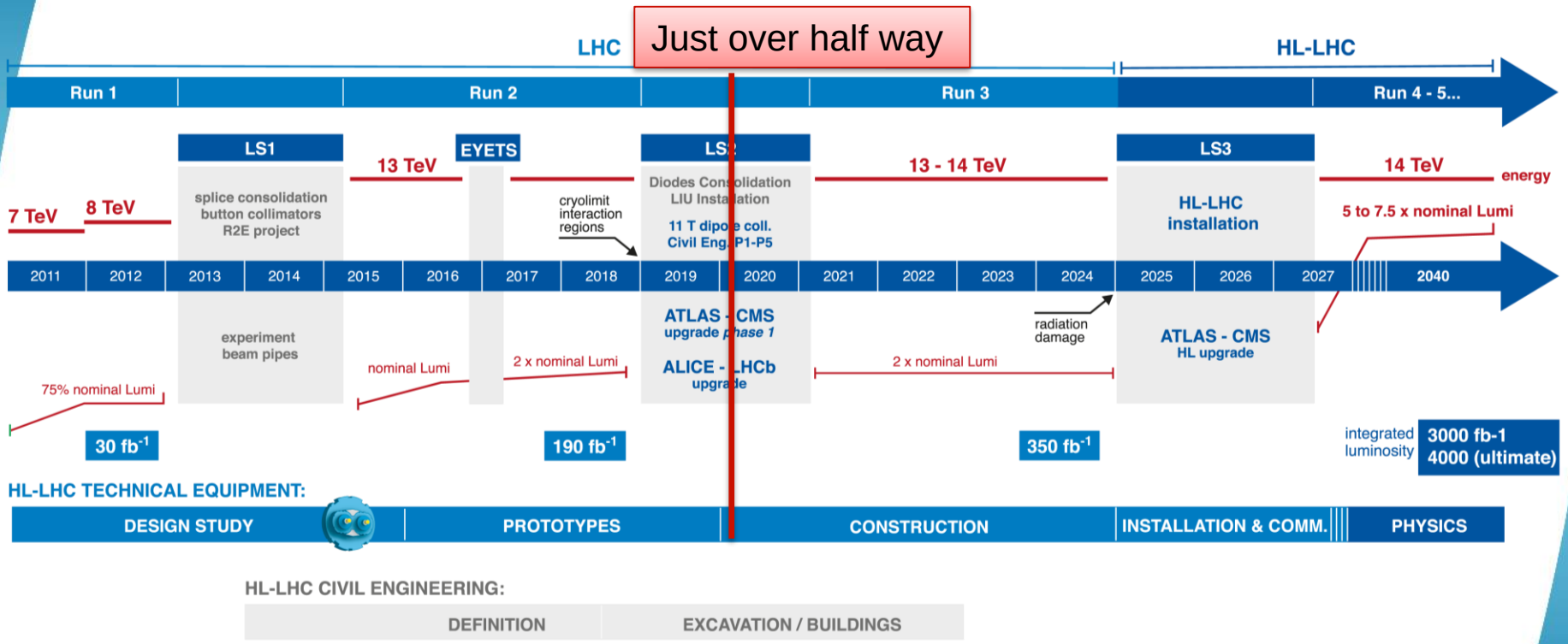
A peak luminosity of L_{peak} = **5×10^{34} $cm^{-2}s^{-1}$ with levelling**, allowing:

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.

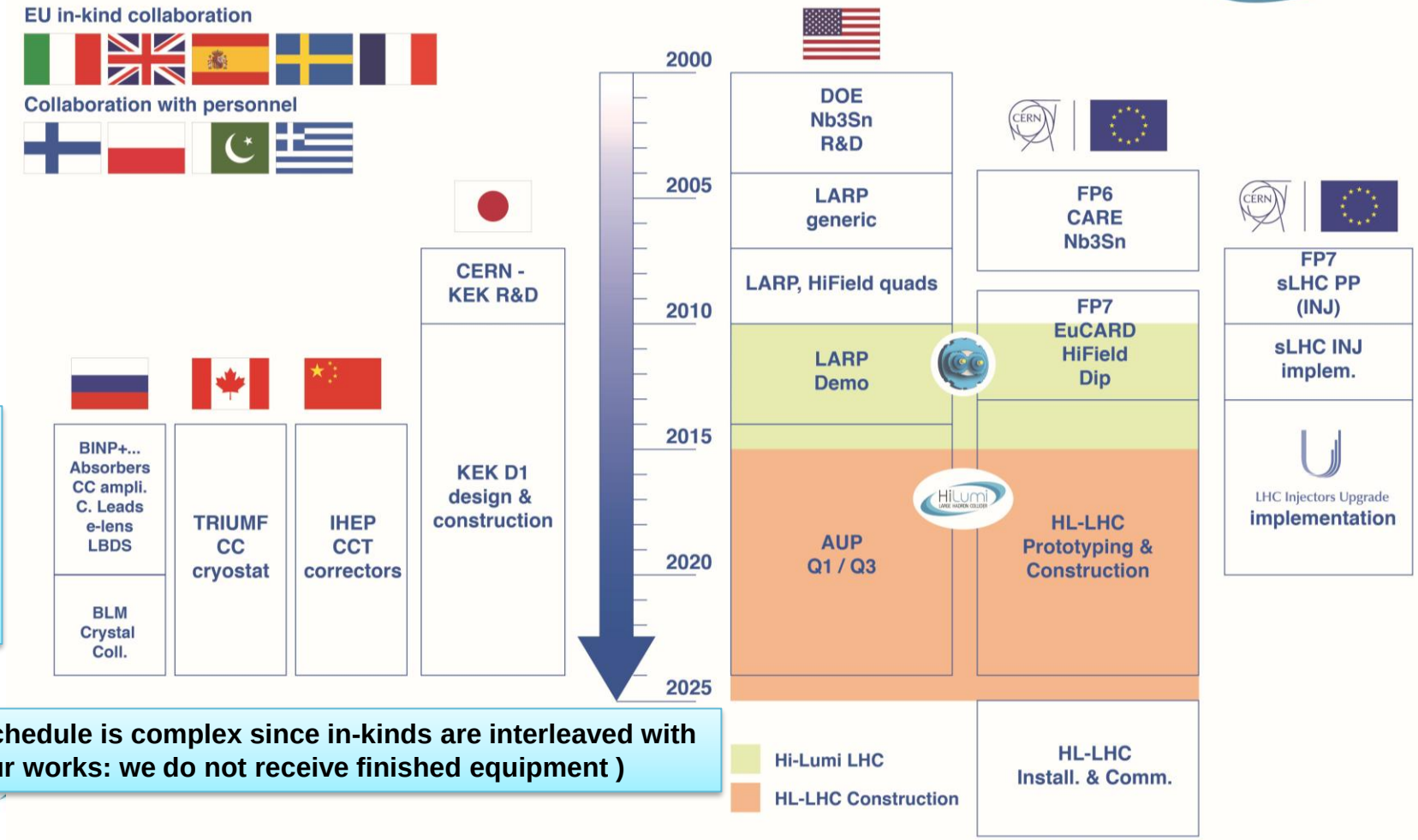
Approved by ESU for PP 2013 as next major European project;
Then fully approved and funded by CERN Council in June 2016

LHC / HL-LHC Plan



HiLumi covers almost 20 years from summer 2010 (CERN DS establishment) to operation in summer 2027

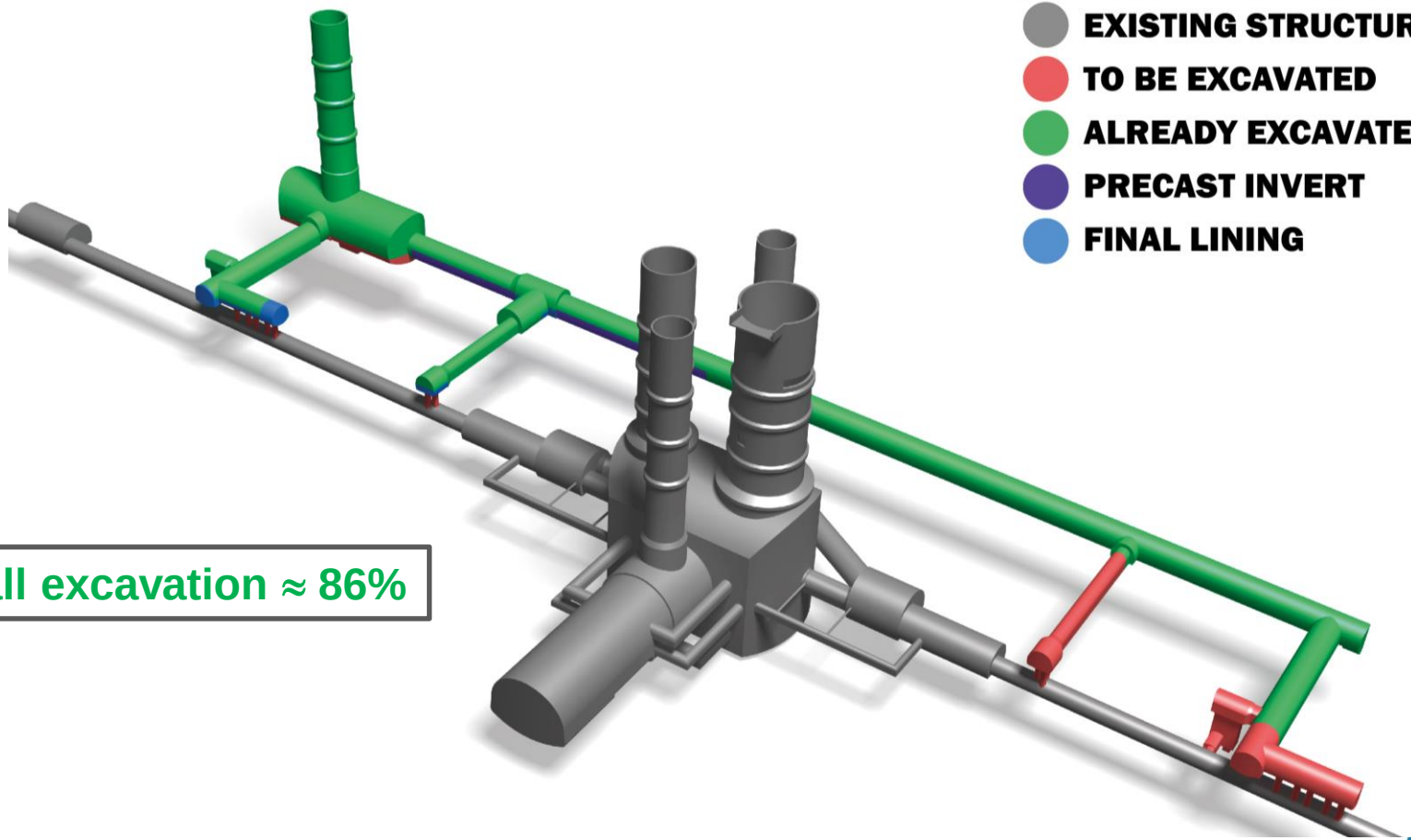
IN-KIND CONTRIBUTIONS



HiLumi: a global project since the start

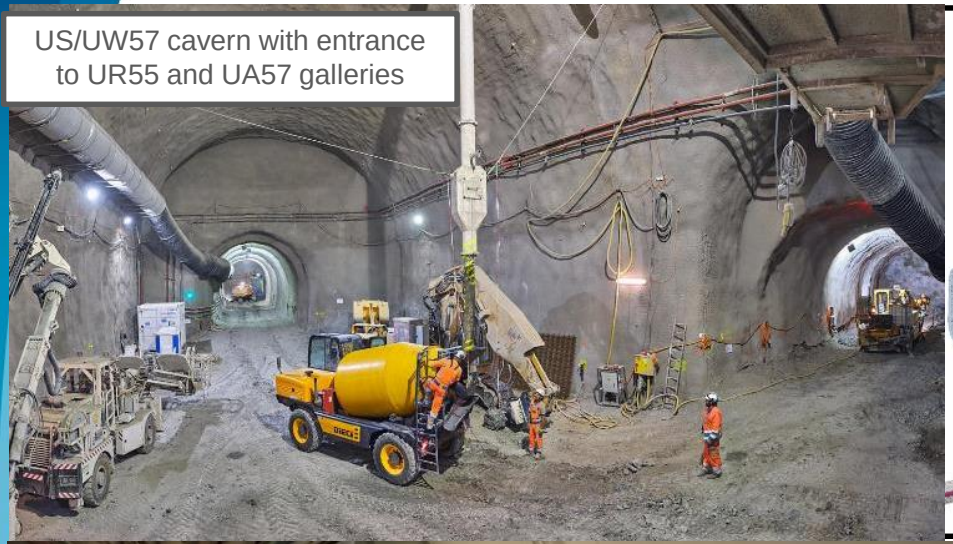
Schedule is complex since in-kinds are interleaved with our works: we do not receive finished equipment)

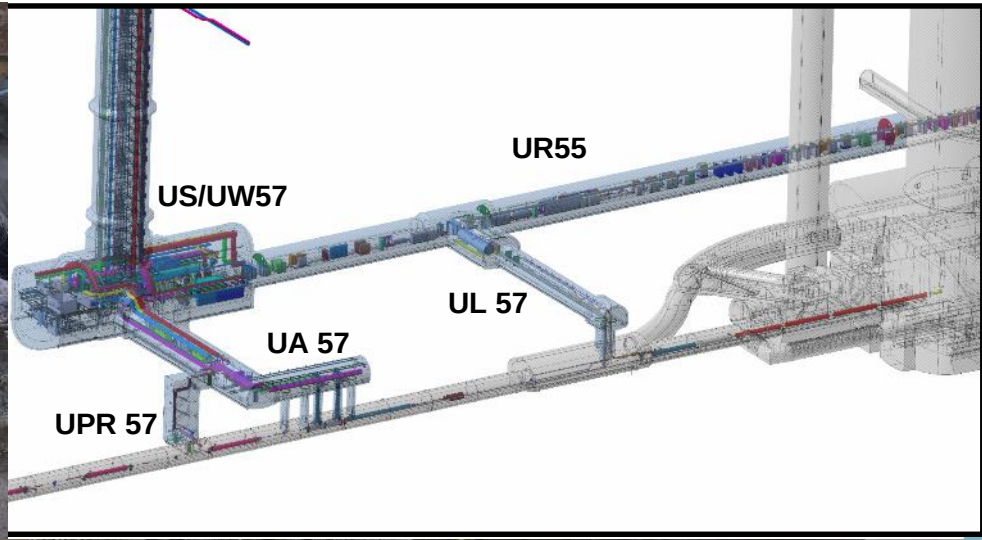
HL-LHC excavation in P1



Overall excavation ≈ 86%

US/UW57 cavern with entrance to UR55 and UA57 galleries



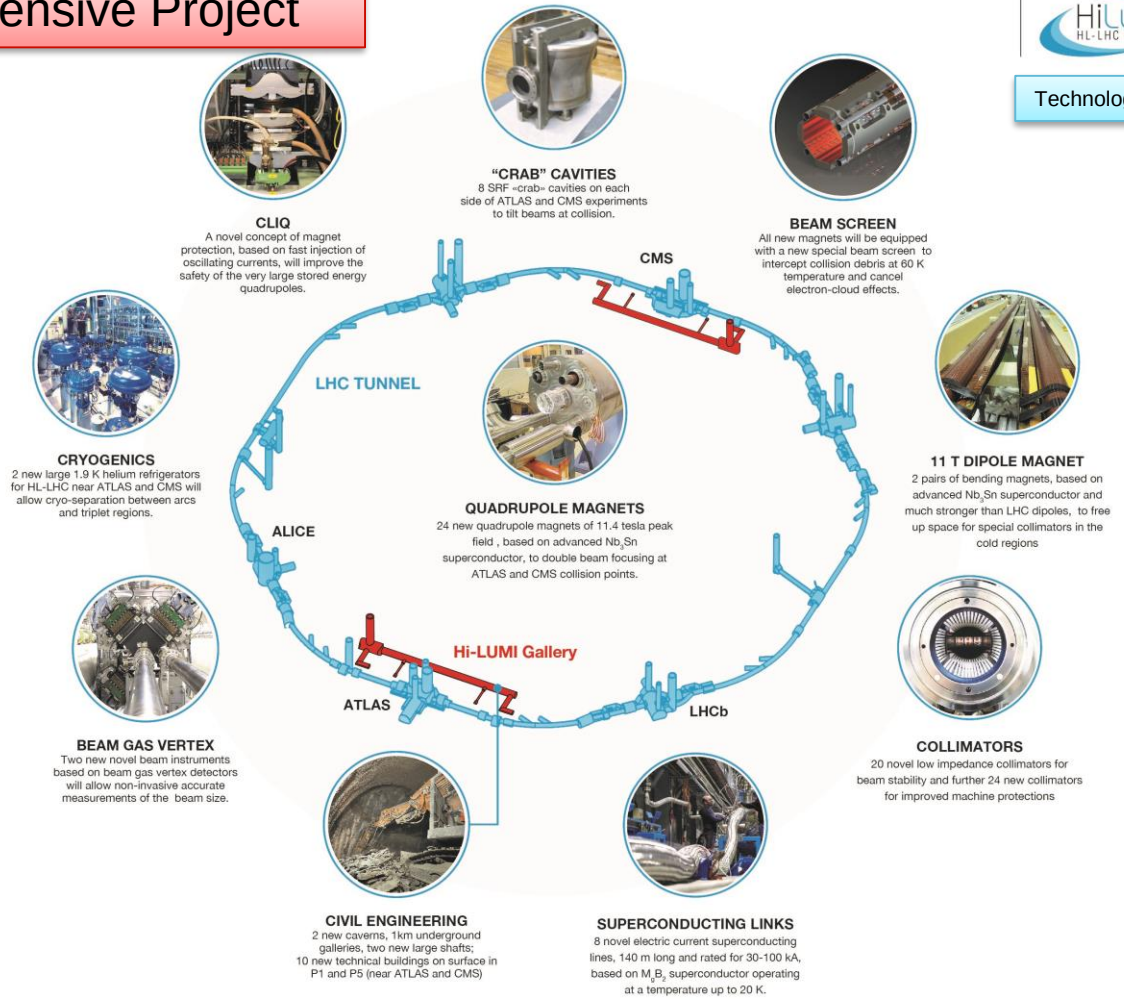


Location of future UPR57 access door into LHC

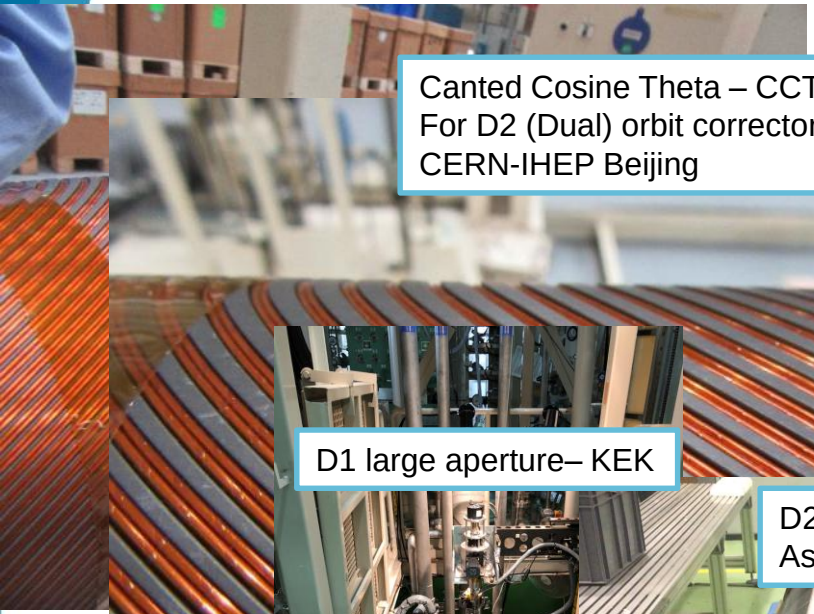
Technology Intensive Project

Technology landmarks

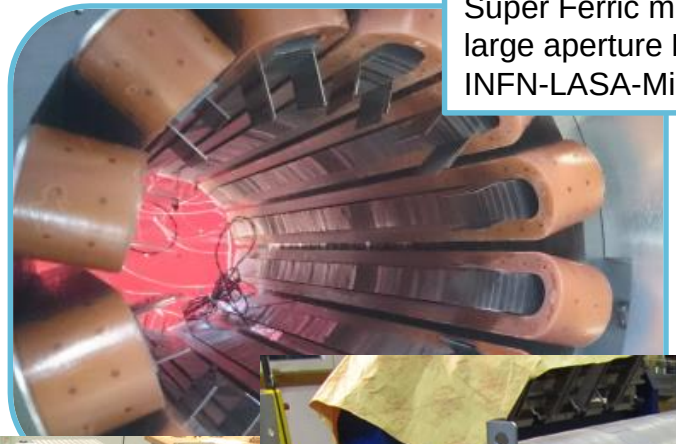
No accelerator project has so many absolute novelties and in such a broad technology spectrum



And more technology novelties…

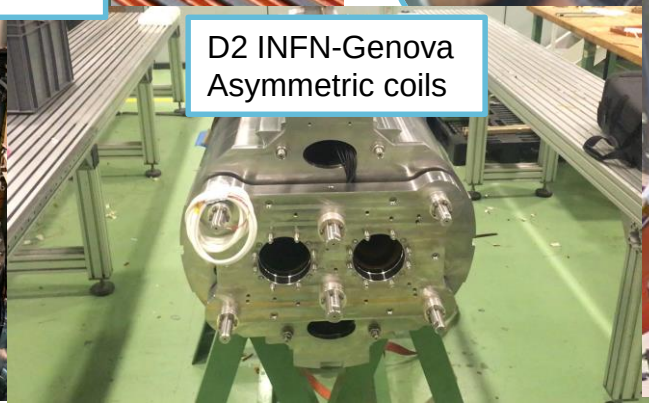


Canted Cosine Theta – CCT
For D2 (Dual) orbit correctors
CERN-IHEP Beijing

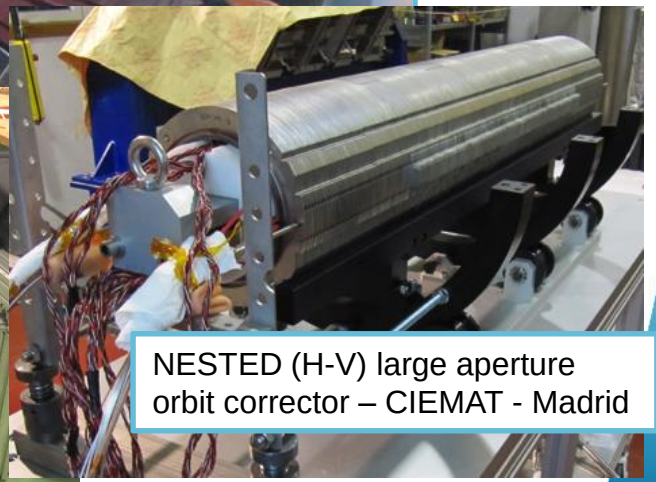


Super Ferric magnets for single large aperture HO Correctors
INFN-LASA-Milan

D1 large aperture– KEK

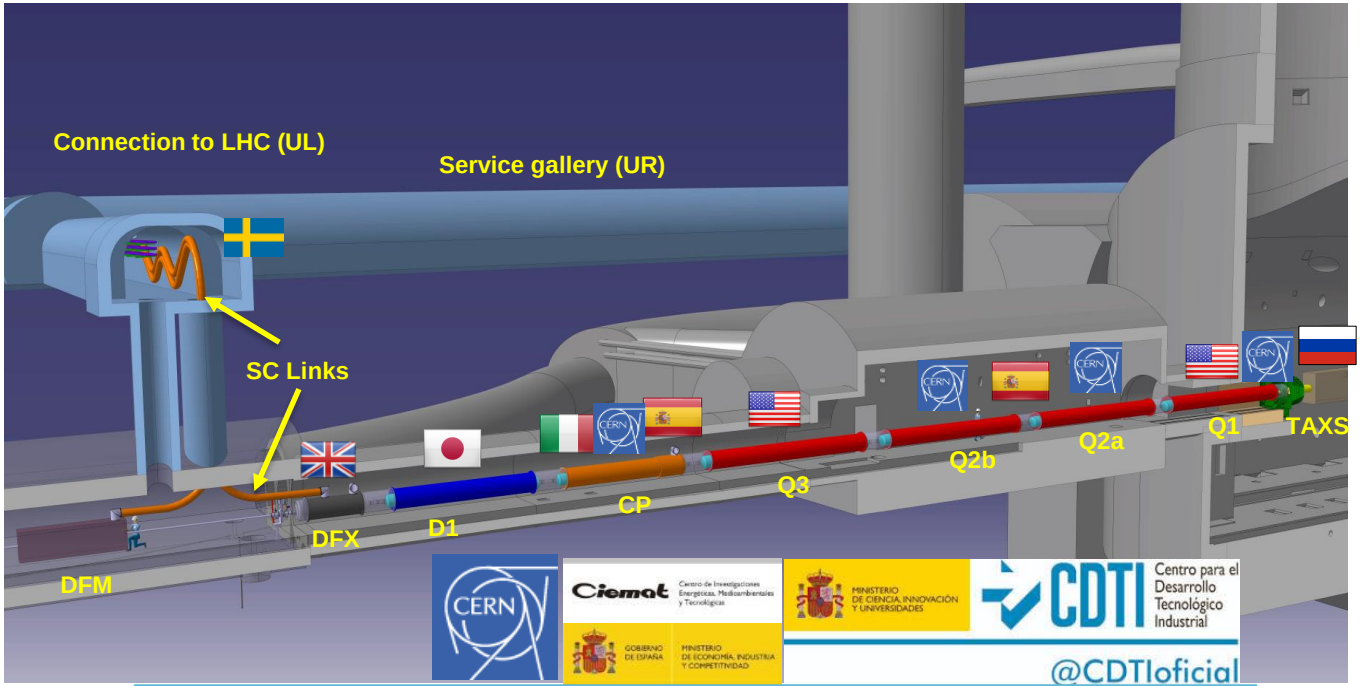


D2 INFN-Genova
Asymmetric coils



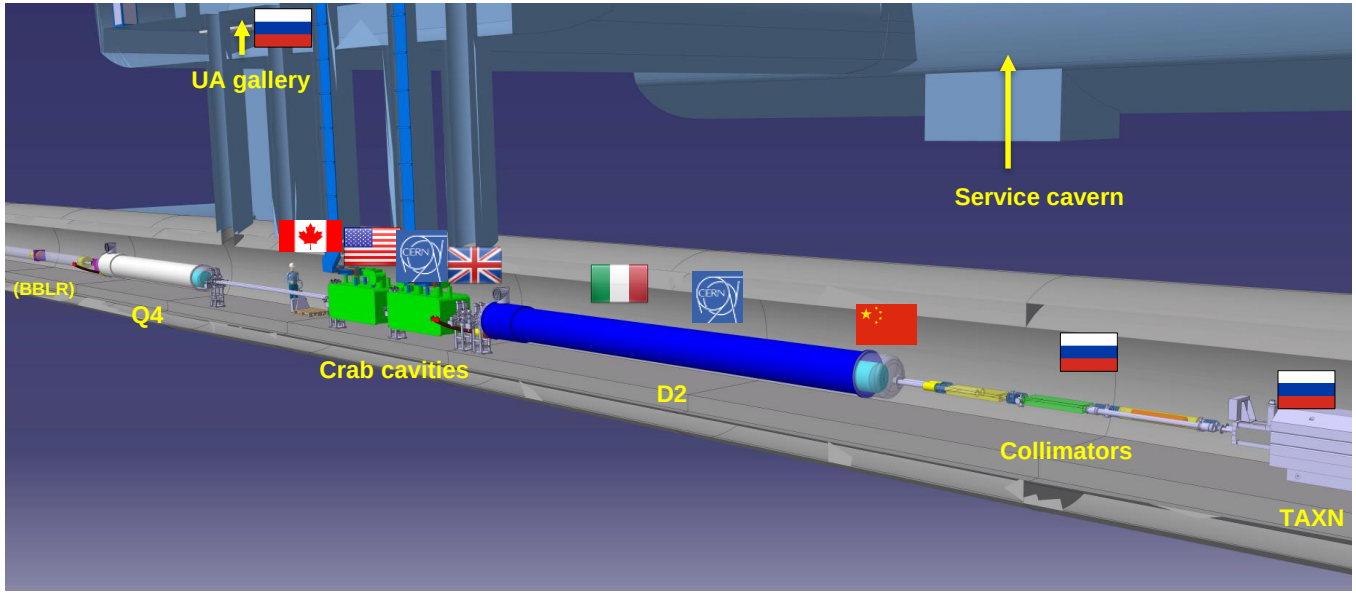
NESTED (H-V) large aperture orbit corrector – CIEMAT - Madrid

High Luminosity LHC - IT region



We need the Spanish collaboration and Industry!

High Luminosity LHC – Matching Section



HiLumi LHC is a wonderful project in a unique environment: thanks for joining us in this adventure!